Temporal Variability in Southeast Asian Dragon Jars: A Case from the Philippines

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INTRODUCTION

Variations in objects are the product of human actions, intentional or unintentional, through socially performed activities organized or carried out by diverse social actors and groups. The identification of the consistency (or inconsistency) of these actions can inform us about the nature of the social groups engaged in material culture production, as well as, indirectly, their consumers. By considering all actions taken on matter in the stages of production of an object, one can discern both broad technical practices as well as seemingly arbitrary choices made by the producers (Lemonnier 1992). The analysis presented in this article demonstrates the fruitful results obtained when these understandings are applied toward an archaeological data set, in this case stoneware jars found in second millennium A.D. mortuary contexts throughout the southern Philippines.

The large stoneware storage and transport jars produced in mainland Asia for the Southeast Asian trade networks of the second millennium A.D. comprise an infrequently studied class of objects (but see Grave and Maccheroni 2009). As containers, they facilitated the transport of ship provisions and trade items intended for the international market. In addition, archaeological, textual, and ethnographic evidence suggest that they played an important symbolic role in some Island Southeast Asian cultural contexts through their incorporation into local ritual and political systems. Despite their importance, little is known of the nature and social context of stoneware jar production, use, and consumption.

This article explores the diverse patterning found in a subset of glazed stoneware storage jars: dragon jars. These are large (30–100 cm in height) brown-glazed stoneware vessels with applied handles on the shoulder. Their name derives from their adornment with incised, impressed, or plastic dragon, lion, demon, or floral motifs. Known to have been produced in mainland Asia, dragon jars were used in trade throughout insular Southeast Asia and the Indian Ocean. They have been recovered in archaeological sites throughout this vast region. The dragon jars in this analysis are derived from mortuary sites in the Philippines that were collected by Carl Guthe in

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the 1920s and are housed in the Guthe Collection at the University of Michigan Museum of Anthropology.

My analysis of these vessels was initially a typological exercise intended to systematically quantify variability in vessel form to identify coherent groups, which could be compared to results from chemical sourcing studies carried out by the Museum's Asian Archaeology division on a subset of the collection. I adopted a methodology focused on documenting the technical practices entailed in each stage of vessel production.[1]

This article presents the results of in-depth exploration of patterning in the defined groups. Synchronic and diachronic variability within and between groups of jars was analyzed. Temporal trends and production locales advanced for dragon jar production were tested against the Guthe Collection to explore patterns across space and site type. The result is a usable chronology based upon a completely described set of types that will allow additional studies of mortuary practice in the Philippines, and be valuable to scholars studying these important and poorly understood ceramics in other regions of the world.

SOCIAL PRODUCTION OF TECHNOLOGY

My work begins from the fundamental premise that technologies, defined as "all aspects of the process of action on matter" (Lemonnier 1992:1), are social productions (Lemonnier 1992; Leroi-Gourhan 1943, 1945; Mauss 1954). Material culture studies can address many questions pertaining to the larger social context in which objects are embedded through examination of the physical indicators of the locus, organization, and characteristics of production, use, and final deposition.

Past research on the social nature of technologies has suggested that social representations, or shared sets of understandings among members of a given social group, influence the development and performance of technological actions (Lemonnier 1992; Leroi-Gourhan 1943, 1945). Since members of social groups (of variable scale and composition) tend to do things in a certain way at specific times, different "traditions of doing" can be discerned through the identification of points or dimensions of variation in the production process. The degree of standardization in this process may vary with the particular social or political characteristics of the group and with the particular dimension of variation under consideration.

Variability in the production of material culture is therefore the result of socially mediated choices in individual human action. These choices range from the gestures used in action on matter (when and how they are used and by whom) to the raw materials collected and prepared to the types of tools employed (Leroi-Gourhan 1943; see also Lemonnier 1992). Following Leroi-Gourhan (1943), variability in all of these is limited by both the action-on-matter function that an object is intended to serve and the above-mentioned temporally and spatially specific social constraints. In short, choices made concerning the material potentials and characteristics of the end product are linked to both cultural characteristics and the local or regional environment in which production occurs. The influence of the social environment cannot be underestimated: an object's social function may influence how producers shape it, even to the point that its final form seems detrimental to the efficiency of its action-on-matter function (Lemonnier 1992). In addition, the use and discard of objects can also result in action-on-matter effects (e.g., reshaping, decay, burning). The result is that all aspects of production, use, and discard are socially relevant and many are technologi-

cally visible. This general point about the social relevance of all variability in material culture is mirrored in the long-standing archaeological debate on style, which accepts that formal variation in material culture can transmit information both consciously or unconsciously (Hegmon 1992; Stark 1998; Wiessner 1983, 1984, 1985; Wobst 1977). The anthropological questions then become: How does a technology operate socially in a specific cultural context? What is the social context for identified variability?

RECOGNIZING VARIABILITY IN MATERIAL PRODUCTION

Building from above, a useful way to characterize the range of variation in a single class of finished objects is to delineate operational chains of production involved in their generation, that is, the "series of operations involved in any transformation of matter (including our own body) by human beings" (Lemonnier 1992:26). Such an analysis identifies which components of the process created the final and often subtle differences between individual objects or classes of objects. Since technological actions are often repetitive, the analysis of large samples of objects permits the delineation of the organizing principles behind what may visually appear to be diverse choices.

Discerning operational chains in an archaeologically derived collection is difficult, since data may be incomplete or compromised due to site formation processes or recording methodologies. Nevertheless, in many cases, useful and comparable information can be found for many individual production stages. One advantage of this method for defining classes of objects is that every recorded variable in the study is treated as the consequence of a socially performed act in a particular stage of production. Thus, even the smallest variable is kept in a social context. Grouping socially relevant variables allows researchers to delineate socially relevant "types." These understandings can then be brought to bear on the search for patterns in the use and distribution of objects.

DRAGON JARS AND THE PHILIPPINES

Large stoneware storage jars served to transport commercial goods (often fragile items), or provisions on long sea voyages throughout Southeast Asia during the second millennium A.D. (Desroches et al. 1996:228–229; Valdes 1993; Valdes and Alba 1993:38–42; Valdes et al. 1992:26). For example, evidence from the Spanish shipwreck the *San Diego* (A.D. 1600) revealed various uses of stoneware jars, including pickled-meat storage, containers for the transport of fine ceramics and, possibly, water storage (Desroches et al. 1996:228–229). Dragon jars were just one class of transport jars used in the region. In their second life in the Philippines they were also important for local social and political relations. What were the regional trends that influenced the transport of dragon jars to the Philippines?

Interregional trade in Southeast Asia during the second millennium A.D. was a complex process involving the material desires of a wide variety of participants and cultures of varying social and political complexity, from Chinese and Spanish empires to dynamic state polities in Thailand, the Vietnamese coast, and Indonesia, to the chiefdoms and non-hierarchical societies of the Philippines and other regions of Island Southeast Asia. The Philippine archipelago had been involved in low-level regional interactions for thousands of years (Solheim 2002). However, expanded trade

networks evolved throughout the second millennium A.D., tying various chiefdoms to larger interregional commerce (Diem 2004; Junker 1999). Archaeological and historical records show evidence of significant indirect Chinese trade (via Malay and Arab traders) with the Philippines starting around A.D. 1000, concurrent with the Song dynasty in China (Fox 1967; Junker 1999). Tributary polities (e.g., Champa and Borneo) along trade routes exchanged Chinese products such as porcelains, fine metals, and other luxury goods for raw materials derived from the highlands and islands, including spices, forest products, and metals (Diem 2004; Junker 1999). Junker (1999) has suggested that occasional commerce likely occurred directly between China and the Philippines, but Filipino attempts to establish direct trade relations with China during this period were denied as Chinese efforts generally focused farther west (Diem 2004:475). Early Song period trade can thus be characterized as indirect and relatively low volume, but involving highly diverse luxury goods (Junker 1999).

Direct trade between China and the Philippines began in the late twelfth century (concurrent with the late Song Dynasty) with the shift from an indirect trade route along the Vietnamese coast to a more direct route from Fujian ports to Taiwan and the Philippines (Diem 2004; Junker 1999; Valdes 1992). By the thirteenth century (late Song and Yuan dynasties), Chinese junks joined Malay ships in these networks at the expense of the polities formerly favored in the indirect tributary system (Junker 1999). The Chinese again exchanged finished products (e.g., porcelain, trade gold, iron pots) for raw materials (e.g., beeswax, cotton, pearls, tortoise shell) (see Junker 1999:196 for complete lists).

Commerce conducted by licensed Chinese merchants was reorganized in A.D. 1371, shortly after the installation of the Ming dynasty in A.D. 1368 (Reid 1993). The centralization of trade entailed a general (though difficult to enforce) ban on private trade and was mirrored in production that was more closely directed by the Chinese Empire, resulting in the manufacture of lower quality, more homogenous products for the international market (e.g., porcelains became coarser and more standardized) (Fox 1967). In order to regulate trade, the Chinese formalized relations with specific trading partners in the Philippines by establishing tributary relations with Philippine chiefs (Junker 1990, 1999; Reid 1993; Valdes et al. 1992) as they had earlier with polities along the Vietnamese coast (Diem 2004). The result was a period of particularly intense interactions between the Philippines and China between A.D. 1372 and 1427 (Diem 2004). In short, the new centralization of control over and general expansion of commerce resulted in mass production of trade goods delivered to specific trading partners.

By the early fifteenth century, the number of licensed Chinese merchants could not keep up with the growing demands of Philippine and other Island Southeast Asian consumers. This was due to a generally anti-foreign political environment in China. The "Ming Gap" (Brown 2004) prompted the expansion of trade between Mainland Southeast Asia (Viet Nam, Thailand) and the Philippines and the development of commercial zones in coastal Mainland Southeast Asia, resulting in "complex interconnected regional networks" (Junker 1999:195). Champa, a loose affiliation of state-level polities located along the central Vietnamese coast (Vickery 2009), were important participants in this network (Diem 2004). By 1567, when China officially lifted the ban on private trade, large numbers of non-Chinese products had already become long embedded in the Philippine market (Reid 1993). The diversification of luxury good producers is not surprising given the many Southeast Asian complex

societies that arose during the second millennium A.D., as well as the arrival of European influence in the region during the sixteenth century.

ARCHAEOLOGICAL EVIDENCE FOR TRADE IN THE PHILIPPINES

Archaeological research suggests that prior to A.D. 1000, foreign materials were relatively unimportant in the social and political economy of Philippine chiefdoms. Locally produced prestige goods, including earthenware, metal, and glass beads, were used in rituals (e.g., receptions, marriages, rites of passage, mortuary rites) and played an important part in building alliances (Bacus 1995; Barbosa 1992; Junker 1999:168). After A.D. 1000, foreign-made products began to replace locally produced socially and politically charged objects. Mortuary data from the cemetery of Santa Ana on the island of Luzon show that Chinese celadons and other glazed stonewares and porcelains supplanted local objects in highly ranked burials of the eleventh through fourteenth centuries A.D. (Junker 1999:171–175).

By the fifteenth to sixteenth centuries, concurrent with the Chinese Ming dynasty, foreign-made goods were pervasive and diverse in elite mortuary contexts. They also extended into lesser elite and commoner burials. There may have been a ten-fold increase in foreign ceramics reaching the Philippines (Junker 1990, 1999:198). According to Fox (1959:355), at the fifteenth-century Calatagan mortuary sites of Kay Tomas and Pulong Bakaw in Batangas Province, southwest Luzon, 50 percent of burials contained foreign-produced goods; Thai and Vietnamese ceramics were widely distributed, while Chinese products were relatively restricted (see also Junker 1999).

The increasing diversity of trade relations is reflected in data that show that some fifteenth-century southern Philippine settlement sites contained 20 to 40 percent Thai and Vietnamese stonewares and porcelains in their foreign assemblages (Junker 1999:202). These data suggest that people in the Philippines were increasingly participating in interregional trade networks with an increasing diversity of trade partners.

THE ROLE OF DRAGON JARS

Historically in the Philippine context, large stoneware jars, especially decorated dragon jars, were more than containers for holding commerical goods. They were foreign-produced and symbolically charged items that were used to store rice wine and beer used in rituals such as births, deaths, and weddings (Barbosa 1992; Desroches et al. 1996). Even today, some groups treat these rare and prestigious heirloom vessels with respect (Barbosa 1992; Harrisson 1986). Scholars have suggested that the integration of foreign-produced dragon jars into Filipino societies was aided by two factors. First, since locally produced jars were traditionally used in rituals, the added prestige of foreignness and increased durability made imported stoneware jars even more symbolically powerful (Barbosa 1992:70–74). Second, the symbolic and potential political power of exotics was expressed in decorative elements such as dragons, floral designs, and other images that were not found in Philippine ceramic traditions. However, it has been suggested that the importance of dragons may have been derived from their association with traditional Philippine symbols (e.g., serpents) (Long 1992:25).

Archaeologically, dragon jars are found as grave goods in mortuary contexts dating between the twelfth and nineteenth centuries in the Philippines. The importance of maintaining access to sources of jars may have been because of the political advantage of controlling the acquisition and distribution of essential ritual objects. Even though they are not the fine porcelains valued throughout Asia, dragon jars may be seen as a form of capital in the political economies of some Philippine chiefdoms. Some recent Filipino societies even had complex ranking systems for jars, reflecting political and social differentiation (Desroches et al. 1996:228–229).

Evidence from the A.D. 1600 *San Diego* shipwreck off Luzon provides insight into the significance of decorated stoneware jars within past Philippine mortuary rituals (Valdes and Alba 1993:43). Of the 621 storage jars on board the *San Diego*, only 5.3 percent were dragon jars. In contrast, more than 50 percent of the large glazed stoneware jars in the Guthe Collection are dragon jars. This suggests that decorated jars may have been incorporated into mortuary contexts at far higher frequencies than undecorated stoneware jars, perhaps pointing to their higher cultural value to indigenous Philippine consumers.

While a considerable amount is known about the historic consumption contexts of these jars, relatively little research has been devoted to understanding the dynamic role of dragon jars in Southeast Asian societies. Since jars were necessary to transport goods from multiple production centers, it is likely that each complex Mainland Southeast Asian commercial center or polity either produced their own or secured access to storage jars made at one or more large-scale production centers. A study of dragon jar production may therefore contribute significantly to our understanding of international commercial competition between Chinese ports and other Southeast Asian centers during this period, as well as more local developments in the islands.

THE GUTHE COLLECTION

The Philippine Expedition or "Guthe" Collection at the University of Michigan Museum of Anthropology is derived from fieldwork carried out by Carl Guthe, the museum's founder and first curator of the "Division of the Orient." Between 1922 and 1925, Guthe recovered archaeological remains from 542 mortuary sites in the southern half of the Philippine archipelago (Sinopoli, this volume). He documented and collected over 13,000 objects, including earthenwares, stonewares, porcelains, beads, and metals. Relevant for this study, the collection contains over 200 large stoneware jars, of which roughly half (~102) are dragon jars. Most (~85) are fragmentary, but 17 are complete. This study focuses on 63 vessels chosen for the completeness of their diagnostic traits. All vessels are provenienced to site, but as in many collections from the early twentieth century, the sample lacks detailed provenience and contextual information. The current documentation system includes the original Guthe Collection numbers (e.g., G-128), an UMMA catalog number (e.g., #34472), and also a CMS number (e.g., CMS 001) from Instrumental Neutron Activation analyses performed on a subset of this collection. These numbers will be referenced throughout the paper.

The University of Michigan's Asian Archaeology Division has been involved since 1995 in studying the dragon jar collection as part of a general program initiated by curator Carla Sinopoli to fully characterize the Guthe Collection. Researchers Stephen Dueppen, Robert Brubaker, Christophe Descantes, Michael D. Glascock, Will Griffin, Hector Neff, Rasmi Shoocongdej, and Robert Speakman have studied the

composition, style, and technology of the dragon jar collection (Sinopoli et al. 2006). My primary research focus, as discussed in this article, has been on stylistic and technological analyses. The results of the compositional analyses are integrated throughout the article.

The study of a fragmentary collection of this sort requires flexibility. While problems of provenience and sampling do not necessarily cripple a study of production, the limitations of various features of the sample influenced the possible types of data recorded. For example, data on vessel form was limited due to a general lack of reconstructable body and base potsherds. Consequently, not all variables could be recorded for many of the potsherds. The following analysis is thus based on those characteristics that were the most common and therefore comparable.

THE LIFE CYCLE OF A DRAGON JAR

The life cycle of a dragon jar can be conceptualized as following a general sequence of seven basic stages (Table 1). Each stage is described below with a short description of relevant analyses. Each of the stages can be further divided into substages.

Stage 1: Procurement of Raw Materials (Clay, Temper, and Materials for Decoration)

Raw materials constitute the basic building blocks for creating a vessel. Much variability is expected in their procurement, as multiple functionally equivalent choices are often available in the environment. Variation may be found in color, texture, and density of the raw clay; chemical/mineralogical composition of the clay; temper material and size; and chemical composition of glaze due to variability in the recipe's raw ingredients.

Three analyses were performed on the dragon jar collection to discern variability in Stage 1. To characterize the paste composition (including clay and nonplastic inclusions), samples were submitted to Instrumental Neutron Activation Analysis (INAA). To characterize the glaze composition, samples were subsequently submitted to laser-ablation inductively coupled–plasma mass spectrometry analysis (LA-ICP-MS). To outline variability in the inclusions, either thin sections or clean breaks from potsherds from all four types described below were analyzed. In addition, petrographic

TABLE 1. GENERAL OPERATIONAL CHAIN FOR DRAGON JAR PRODUCTION

Stage 1—Procurement of Clay, Temper, and Decoration Materials
↓
Stage 2—Preparation of Paste
↓
Stage 3—Formation of Vessel
↓
Stage 4—Decoration of Vessel
↓
Stage 5—Firing of Vessel
↓
Stage 6—Distribution and Use of Vessel
↓
Stage 7—Discard

thin sections were prepared of the samples subject to chemical characterization, but their analysis is not included here.

Stage 2: Paste Preparation

This stage combines raw materials into a mixture that permits vessel shaping appropriate to the forming technology used. Variation may be found in the types and relative frequency of all the raw materials noted in Stage 1 above and the density/porosity of paste and inclusions.

To characterize the treatment of the paste made from the raw materials, a thin section/clean break was made in order to examine the density and inclusion distributions from the collection. Since Stage 1 and Stage 2 are analytically related, they are discussed together below.

Stage 3: Vessel Formation

There is potential for great variability in techniques in this stage, as potters seek to create vessels with specific forms and properties, often appropriate to an anticipated set of functions. Variation may be found in formal characteristics such as shape, thickness, angles, diameters, and so on and in vessel formation techniques such as coils, slabs, wheel, and mold.

To characterize vessel formation practices, rim forms were recorded when available and vessel thickness was systematically recorded for each vessel; however, data on vessel body formation were rare. Handles were all composed of clay strips that were attached to the vessel in the same manner, despite differences in orientation (vertical/horizontal) or decoration (see next stage). Handles were primarily used to attach or tie lids to the vessel top.

Stage 4: Vessel Decoration

Decoration is here defined as all external treatment of a vessel, including some features such as handles that are also functional for jar usage. Decorations on dragon jars were divided into three classes: primary motifs, lug handles attached to the shoulder/neck, and glaze. Variation may be found in the techniques employed in the plastic decoration of each vessel, including sequence, location, and form of decorative treatments and in glaze application.

An extensive study of decorative techniques was performed recording the sequence (order) of techniques responsible for all decorations.

Stage 5: Firing of Vessels

Variation in firing techniques may be observed through both direct and indirect means. The pottery itself provides indirect evidence of technique since different temperatures and atmospheres of firing have different effects (stoneware, earthenware, porcelain, color and texture of glaze or surface). In this case, stoneware was chosen for functional reasons (i.e., its impermeability). More directly, kilns and associated wasters provide information on firing technology, scale, and types of ceramics produced. Recent evidence from the Vietnamese–Japanese excavations in Central Viet Nam (e.g.,

of the Go Sanh kilns) is assessed below (Aoyagi 2002; Diem 1999, 2004; Koezuka et al. 1996; Morimoto and Ohashi 2002; Yamamoto et al. 1993).

Stage 6: Vessel Distribution/Use

Direct evidence for dragon jar usage is found in shipwrecks and potentially in domestic contexts. Mortuary use of the vessels is considered a category of discard, so is discussed below. This article assesses available shipwreck data and historical evidence relevant to this stage, which is considered the primary use-life of these vessels. Currently, evidence (i.e., through residue analysis or spatial location in archaeological sites) for the use of dragon jars in the Philippines prior to discard is not available.

Stage 7: Discard

Dragon jars are found in large parts of Asia and the Indian Ocean in archaeological contexts; others remain in use in household contexts. A portion of dragon jars has been deposited in mortuary sites in the Philippines (including those in the Guthe Collection). Thus, in this study, my analysis of this stage is largely limited to the Guthe Collection disposal, which can be characterized as ritually based discard.

DRAGON JAR TYPES

In this section, I present my typological analysis of the Guthe Collection dragon jars. Four dragon jar groups were identified; they are presented holistically based upon evidence for production Stages 1–4. Evidence for each stage yielded highly redundant patterning; each jar type can be most easily defined by a unique operational chain for primary motif production, that is, the dragon or floral designs that appear on the neck, shoulder, or body of each vessel (Table 2).[2] The results of my analysis of handle decoration were similar to those for primary motifs (Table 3).

Table 2. Primary Motif Production Sequences

SEQUENCE #1 MOLD-IMPRESSED TECHNIQUE	SEQUENCE #2 MOLD-ATTACHED, IMPRESSED, AND INCISED TECHNIQUE	SEQUENCE #3 COIL AND INCISED TECHNIQUE	SEQUENCE #4 MOLD-ATTACHED AND/OR IMPRESSED TECHNIQUE
Mold produced (Ornate) ↓ Mold impressed into vessel shoulder ↓ Glaze over motif	Mold produced (Simple body outline) ↓ Clay impressed into mold, then attached to vessel shoulder or body ↓ 1. Incised decorations on and around dragon. 2. Impressed semicircles for scales ↓ Glaze over motif	Thin clay coils hand-produced ↓ Separate coils attached and combined to create plastic dragon ↓ Parallel 45 degree incisions made on dragon body ↓ Glaze over motif	Mold produced (Multiple types—ornate) ↓ Clay impressed into mold, then attached to vessel shoulder or main body **or** Mold impressed into vessel body ↓ Glaze over motif

Table 3. Handle Production Sequences

SEQUENCE #1 MOLD-IMPRESSED AND INCISION TECHNIQUE	SEQUENCE #2 MOLD APPLICATION, INCISION, AND IMPRESSION TECHNIQUE	SEQUENCE #3 VERTICAL INCISION TECHNIQUE	SEQUENCE #4 HORIZONTAL INCISION TECHNIQUE
Mold produced ↓ Clay strip produced ↓ Handle decorated: mold impressed into strip, vertical lines incised above and below impression ↓ Handle attached to vessel (vertical) ↓ Glaze over handle	Mold produced ↓ Clay strip produced ↓ Vertical channels made in clay strip ↓ Handle attached to vessel (vertical) ↓ Additional clay impressed into mold and applied by hand to handle strip ↓ Handle decorated with incisions/impressions (optional)* ↓ Glaze over handle	Clay strip produced ↓ Vertical incisions cut into strip ↓ Handle attached to vessel (vertical) ↓ Glaze over handle	Clay strip produced ↓ Horizontal incisions cut into strip ↓ Handle attached to vessel (horizontal) ↓ Glaze over handle

*The special dragon handles lack vertical incisions, but various features are incised and semicircular scales are impressed, as in the primary motif.

The evidence from various other stages of the production sequence is also informative, revealing patterns that are less obvious than decoration, but that were relevant to discerning variability in the collection. These patterns aided in the analysis of provenience and synchronic and diachronic variability in production, use, and discard, which follows the presentation of the four "production traditions" typologically identified for dragon jars (Table 4).

Summary of Tradition 1 Jars

The primary motifs of Tradition 1 jars are illustrated in Figure 1 and their production is summarized in Table 5. These jars (N = 11) are composed of a dense gray paste with few inclusions, have elongated and everted rims that are rounded (beaded) on the end, with rim diameters between 14–16/16–21 cm (interior/exterior), and are only 5.6 mm thick. Tradition 1 jars are shaped as inverted long convex cones in two size classes with heights of c. 33 and 67 cm. Thin, snake-like dragons with horns on the head and a crest behind the face, whiskers beneath the chin, and four legs with three claws each are impressed on vessel shoulders with molds or stamps. Likewise, six vertical handles with mold-impressed dragon or devil faces surrounded by incisions are attached between the neck and shoulders of the each vessel. They are covered with an olive-brown glaze.

While Tradition 1, even more so than the other traditions discussed below, is very tightly defined within a narrow range of variation, a dragon jar from a domestic context at the fifteenth-century site of Kingany I-1 in northwestern Madagascar provides

an interesting comparative case (Vérin 1972:293–301, fig. 90). Despite numerous formal and decorative similarities to Tradition 1 jars from the Guthe Collection, the Kingany vessel has significant differences including a right-facing dragon, only three handles, a different handle motif, and a smaller size. The characteristics of the Kingany vessel are presented in a separate column in Table 4 and for comparative purposes in Table 5. As discussed below, this alternative Tradition 1 jar was produced in a different location from the main group, and consequently provides evidence of the complexity of dragon jar production.

Summary of Tradition 2 Jars

The primary motifs of Tradition 2 jars are illustrated in Figure 2 and their production is summarized in Table 6. These jars (N = 35) are composed of gray pastes with a variety of densities and inclusions, have triangular-shaped everted rims with diameters between 11–20/12.5–25 cm (interior/exterior), and an average thickness of 8.2 mm. They have mold-attached (sprigged, formed as a separate element in a mold and then attached to the vessel body or shoulder) dragons and horse-dragons with incised and impressed embellishments. Whiskers, facial features, and fins on the back are made by incision; scales are made by semicircular impressions; there are four feet with three toes each. Ten vessels have incised floral motifs next to the dragons. These decorations are always oriented left.

Three main classes of vertical handle are associated with this group. The first is a dragon-body handle that is basically an extension of the primary motif and is thus embellished with incisions and semicircular impressions (see dragon handle #34473 in Figure 2). The second and most common type of handle was produced following a different sequence. The composite technique combined a strap handle with a mold-formed plastic motif (see dog/dragon handle #19924 in Figure 2). An example of a third class of handle, the fish handle (#18194), is shown in Figure 2. It combines the operational sequence for the primary motif with that from the second handle class, combining a mold-formed face to the base of a thick coil of clay, which is then embellished with channels, incisions, and semicircular impressions similar to the primary motif. In addition to the fish handle, a common handle in this class is the lion handle, which has an attached face and gouges along the handle rather than incisions and impressions (Quimpo 1982:47). Tradition 2 vessels are covered most frequently with an olive-brown glaze.

Summary of Tradition 3 Jars

The primary motifs of Tradition 3 jars are illustrated in Figure 3 and their production is summarized in Table 7. These jars (N = 6) are composed of gray/pink pastes with a variety of densities and inclusions. Their rims (diameter 17–20.5 cm interior/23.5–29 cm exterior) are flared eversions with a beaded lip turned downward or straight-necked with slightly everted beaded lips, and vessels only 6 mm thick. The dragons applied to the shoulder of the vessel are built from hand-formed coils and decorated with diagonal incisions or gouges on the head and body. The dragons are made with an amalgam of coils, a big coil for the body and smaller ones for the appendages and head. They have horns, but no whiskers, and four legs with claws that have a "root-like" appearance. The vessels have six vertical handles with simple vertical incisions.

TABLE 4. COMPARISON AMONG PRODUCTION TRADITIONS

VESSEL TRADITION	TRADITION 1 (N = 11)	TRADITION 2 (N = 35)	TRADITION 3 (N = 6)	TRADITIONS 4A AND 4B (N = 10)	KINGANY VESSEL (VÉRIN 1972: 295–301)
Raw material source—paste	1 unique source (N = 6)	1 unique source (N = 14)	1 unique source (N = 2)	1 unique source (N = 5)	Same source as tradition 3
Paste composition	Gray paste with few small inclusions and high density	Gray paste with diverse inclusions and densities	Gray paste with diverse inclusions and densities	Red paste with diverse inclusions and densities	Clear white paste
Rim shape	Everted and elongated rim with rounded lip	Everted rim with pointed lip (1 exception)	Straight and slightly everted rim (1 exception)	Everted rim with rectangular lip	Everted rim with pointed lip
Average vessel thickness at neck	5.6 mm	8.2 mm	6.0 mm	4A: 6.3 mm 4B: 8.0 mm	6.0 mm
Rim diameter (interior / exterior)	14–17/18–23 cm	11–20/12.5–25 cm	17–20.5/23.5–29 cm	10–18/14–22.5 cm	Unknown
Vessel shape	Inverted long convex cone with high, wide shoulder (N = 5)	Unknown	Inverted long convex cone with high, wide shoulder (N = 3)	Unknown	Inverted long convex cone with high, wide shoulder
Vessel height	33 cm or 67 cm (N = 4)	Unknown	63 cm (N = 3)	Unknown	58 (est.)
Glaze color	82% olive brown	86% olive/olive brown	83% olive/olive brown	60% dark yellow brown, 20% dark brown, 20% olive brown	Yellow brown
Glaze composition	1 unique recipe (N = 4)	1 unique recipe (N = 9) shared with Tradition 3	1 unique recipe (N = 2) shared with Tradition 2	1 unique recipe (N = 5)	Same as Traditions 2 and 3

(*Continued*)

TABLE 4 (*Continued*)

General decoration technique	Mold impressed with no embellishment	Mold applied with incised and impressed embellishment	Coil applied with incised embellishment	Mold impressed (4A) or attached (4B) with no embellishment	Mold impressed with no embellishment
Archaeological indicator for technique	Negative of motif on vessel interior	Separation between motif and vessel visible in cross section	Separation between motif and vessel visible in cross section	4A: Negative of motif on vessel interior 4B: Separation between motif and vessel visible in cross section	Negative of motif on vessel interior
Location of vessel decoration	Shoulder	Shoulder or body	Shoulder	Shoulder or body (dragons on shoulder only)	Shoulder
Dragon decoration	Thin, snake-like dragon with molded horns, crest, whiskers, and scales. Three claws on each foot. Faces left.	Diverse dragon morphology, but all have incised whiskers, nose, beard, mouth, and back fin. Scales and eyes are semicircular impressions. Three toes on each foot. Faces left.	Dragon formed from simple clay coils, with separate smaller coils used for legs, head, horns, and claws. Scales are parallel diagonal gouges. Three claws on each foot. Faces right.	Large dragon with molded horns, whiskers, and scales. Claws in varying numbers on each foot. Faces up or down.	Thin, snake-like dragon with claws. Facial characteristics are unknown.
Other decoration	Incised lines (N = 1), and incised floral decoration at shoulder (N = 1)	Incised floral decoration at shoulder (N = 10)	Incised lines on body and shoulder (N = 3)	Floral designs on most 4A vessels (mold-impressed dragons) (N = 7)	None
General handle production technique	Mould impressed with straight incisions	Mold attached with incised and impressed embellishments	Hand formed with straight incisions	Hand formed with straight incisions	Mold impressed
Handle motifs	Anthropomorphic (Devil?)	Dragons, dogs, human-dragons, fish	None	None	Human face
Handle orientation	Vertical	Vertical	Vertical	Horizontal	Vertical
Number of handles	6 (N = 4)	Unknown	6 (N = 3)	Unknown	3

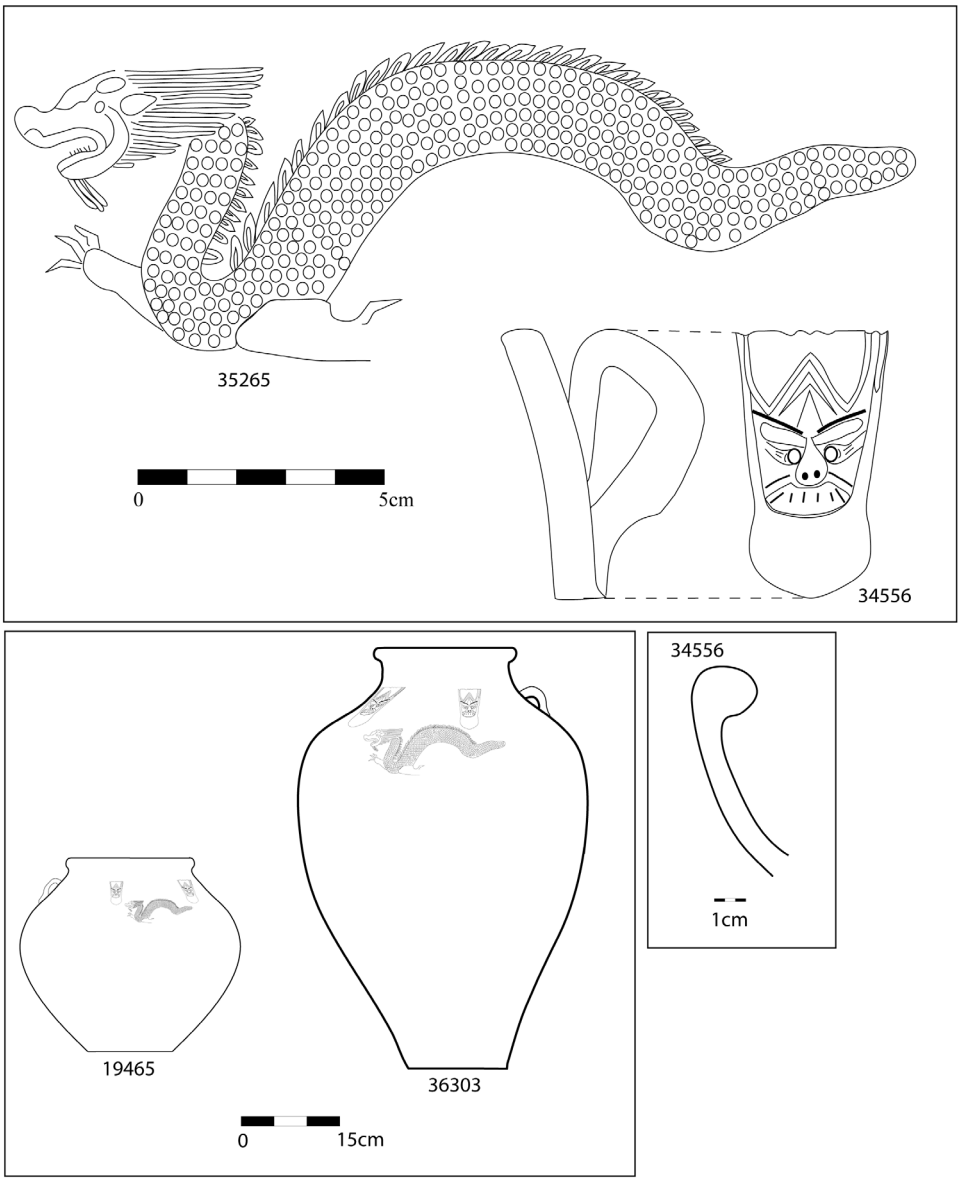

Fig. 1. Tradition 1 montage (primary motif, handle motif, and vessel form). Note that the neck of the dragon in #34473 served as the lug handle.

They are covered with an olive to olive-brown glaze. Vessel shape is an inverted long convex cone with a wide, high shoulder and small base.

Summary of Tradition 4 Jars

The primary motifs of Tradition 4 jars are illustrated in Figure 4 and their production is summarized in Table 8. These jars (N = 10) are composed of a red paste of variable density and inclusions. They have everted rims with rectangular-shaped lips; vessel

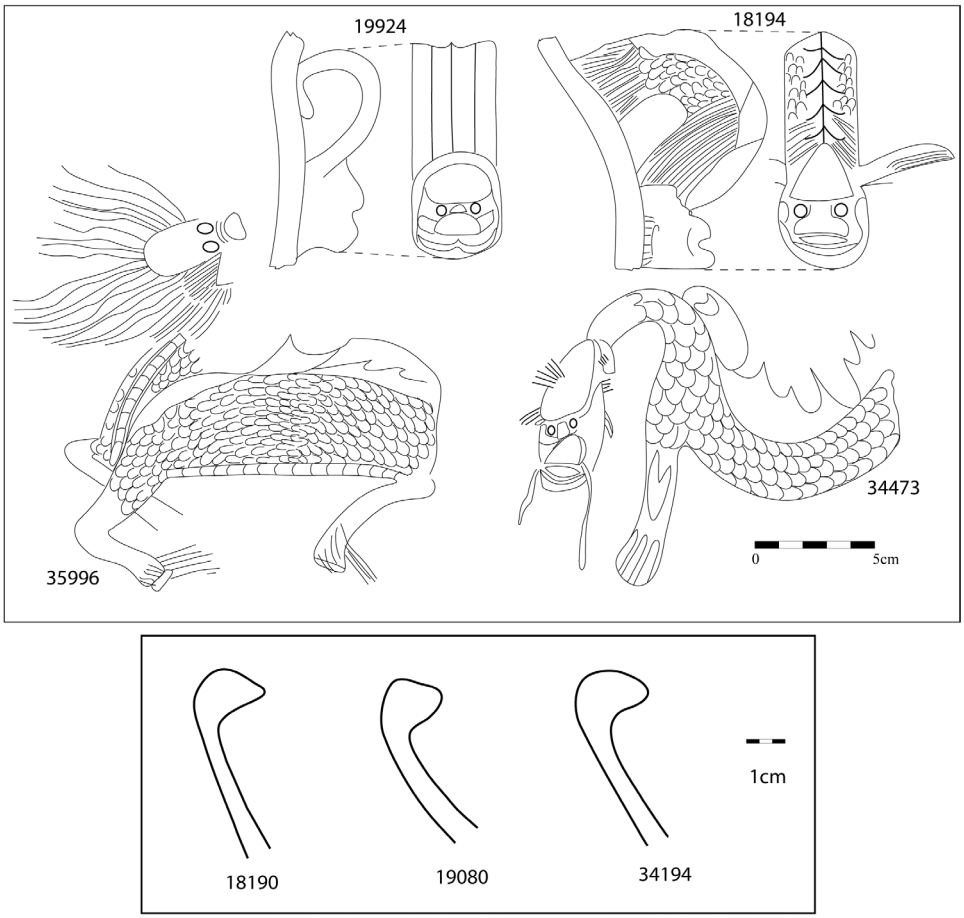

Fig. 2. Tradition 2 montage (primary motifs, handle motifs, and rim form).

thickness averages 6.8 mm. There are two classes of visually similar primary motifs, representing dragons, fish, and flowers. The dragons are comparatively large, with whiskers and horns; the other motifs are very diverse and include symbols. The two classes are distinguished by different production techniques. One (4A) is a mold-impressed technique similar to Tradition 1, although the dragons are stylistically different and often impressed on the vessel body rather than the shoulder. The other (4B) is mold-attached, similar to Tradition 2 but without incised and impressed embellishments. 4A vessels sometimes have floral designs, whereas the 4B vessels in the sample only have dragons. Both have horizontal strap handles with simple incised lines. They are covered with a dark yellow-brown glaze.

DRAGON JAR PRODUCTION LOCALES

The decorative variability discussed above revealed four very different traditions of pottery manufacture for the dragon jars in the Guthe Collection. To establish how these traditions were distributed in space (i.e., in discrete centers of production) and

Table 5. Production Tradition 1 Dragon Jars

UMMA catalog #	Guthe #	CMS #	Island	Vessel thickness (mm)	Vessel height (cm)	Rim diameter (cm)	Maximum vessel diameter (cm)	Base diameter (cm)	Primary motif (dragon) decoration technique	Primary motif (dragon) embellishment	Primary motif (dragon) orientation	Primary motif (dragon) location	Incised decoration on vessel	Handle decoration technique	Vertical incisions on handle	Handle orientation	Handle motif	Number of handles/vessel	Paste color and density	Paste inclusions	Glaze group	Glaze color
19465	B125-1	—	Bohol	5	30.5	15/19	34	13.8	MI	MI	Left	Shoulder	No	MI	Yes	Vertical	Devil	6	Dense grey	Few organic	—	Olive brown
18766	B39-1	—	Cebu	5	33	16/21	35	12.7	MI	MI	Left	Shoulder	Yes	MI	Yes	Vertical	Devil	6	Dense gray	Few organic	—	Olive brown
78859	B49-26	—	Cebu	5	—	—	—	—	MI	MI	Left	Shoulder	No	MI	Yes	Vertical	Devil	—	Dense gray	Few organic	—	Olive brown
34019	C11-335	18	South Bohol	5	—	15/18	—	15.5	MI	MI	—	Shoulder	No	MI	Yes	Vertical	Devil	—	Dense gray	Few organic	1	Olive brown
34554	C28-1	23	North Mindanao	7.5	—	—	—	—	MI	MI	—	Shoulder	No	MI	Yes	Vertical	Devil	—	Dense gray	Few organic	1	Dark brown
34556	C28-3	12	North Mindanao	6	—	15/18	—	—	MI	MI	Left	Shoulder	No	MI	Yes	Vertical	Devil	—	Dense gray	Few organic	1	Dark yellow brown

(*Continued*)

TABLE 5 (*Continued*)

19880	C6-11	—	West Cebu	6	—	—	—	—	MI	MI	Left	Shoulder	No	MI	Yes	Vertical	Devil	—	Dense gray	Few organic	—	Olive brown
35265	G10-a	7	Camiguin	4	—	17/23	—	—	MI	MI	Left	Shoulder	No	MI	Yes	Vertical	Devil	—	Dense gray	Few organic	—	Olive brown
35523	G88-1	10	Siquijor	6	—	18.5/14	39	—	MI	MI	Left	Shoulder	Yes	MI	Yes	Vertical	Devil	6	Dense gray	Few organic	—	Olive brown
35539	G91-1	29	North Masbate	5.5	—	—	—	—	MI	MI	—	Shoulder	No	MI	Yes	Vertical	Devil	—	Dense gray	Few organic	1	Olive brown
36303	M28-162	—	Jolo (Sulu)	7	67	16.5/22	48.5	16	MI	MI	Left	Shoulder	No	MI	Yes	Vertical	Devil	6	Dense gray	Few organic	—	Olive brown
—	Kingany	30	Madagascar	6	58	15/20	38	15.5	MI	MI	Right	Shoulder	No	MI	Yes	Vertical	Human	3	Clear white	NA	3	Yellow brown

MI = mold impressed.

TABLE 6. PRODUCTION TRADITION 2 DRAGON JARS

UMMA CATALOG #	GUTHE #	CMS #	ISLAND	VESSEL THICKNESS (mm)	RIM DIAMETER (cm)	BASE DIAMETER (cm)	PRIMARY MOTIF (DRAGON) DECORATION TECHNIQUE	PRIMARY MOTIF (DRAGON) EMBELLISHMENT	PRIMARY MOTIF (DRAGON) ORIENTATION	PRIMARY MOTIF (DRAGON) LOCATION	INCISED FLORAL DECORATION ON VESSEL	HANDLE DECORATION TECHNIQUE	HANDLE EMBELLISHMENT	VERTICAL CHANNELS ON HANDLE	HANDLE ORIENTATION	HANDLE MOTIF	PASTE COLOR AND DENSITY	PASTE INCLUSIONS	GLAZE GROUP	GLAZE COLOR
18048	B4-31	43	Koulan	9	15/18	—	MA	—	Left	Shoulder	—	MA	—	1	Vertical	Dog	Gray	Large organics and grog	2/3	Olive brown
18190	B4-173	31	Koulan	7	13/16.5	—	MA	SCI/INC	—	—	—	—	—	—	—	—	Gray	Large grog	2/3	Olive brown
18193	B4-176	—	Koulan	—	—	—	MA	SCI/INC	Left	—	—	—	—	—	—	—	Dense gray	Medium organics	—	Olive brown
18194	B3-177	—	Koulan	9	—	—	MA	SCI/INC	—	Body	—	MA	SCI/INC	—	Vertical	Fish	Dense gray	Medium organics	—	Olive brown
18195	B4-178	—	Koulan	6	—	—	MA	SCI/INC	—	—	—	—	—	—	—	—	Gray	Small organics	—	Olive brown
18197	B4-180	—	Koulan	6	—	—	MA	SCI/INC	—	Body	—	MA	—	1	Vertical	Dog	Gray	Large grog	—	Olive brown
18197 (2)	B4-181	—	Koulan	—	—	—	—	—	—	—	Yes	MA	Gouges	—	Vertical	Lion	Dense gray	Medium organics	—	Dark olive brown

(*Continued*)

TABLE 6 (*Continued*)

UMMA CATALOG #	GUTHE #	CMS #	ISLAND	VESSEL THICKNESS (mm)	RIM DIAMETER (cm)	BASE DIAMETER (cm)	PRIMARY MOTIF (DRAGON) DECORATION TECHNIQUE	PRIMARY MOTIF (DRAGON) EMBELLISHMENT	PRIMARY MOTIF (DRAGON) ORIENTATION	PRIMARY MOTIF (DRAGON) LOCATION	INCISED FLORAL DECORATION ON VESSEL	HANDLE DECORATION TECHNIQUE	HANDLE EMBELLISHMENT	VERTICAL CHANNELS ON HANDLE	HANDLE ORIENTATION	HANDLE MOTIF	PASTE COLOR AND DENSITY	PASTE INCLUSIONS	GLAZE GROUP	GLAZE COLOR
18198	B4-181	—	Koulan	7	—	—	MA	SCI/INC	Left	—	Yes	MA	—	2	Vertical	Dog	Dense gray	Medium organics	—	Olive brown
18200	B4-183	—	Koulan	8.5	—	—	MA	SCI/INC	—	—	Yes	MA	—	—	Vertical	Dog	Dense gray	Medium organics	—	Olive brown
18203	B4-186	38	Koulan	8	—	—	MA	SCI/INC	—	Body	—	MA	Gouges	1	Vertical	Lion	Gray	Medium organics	—	Olive
18205	B4-188	19	Koulan	8	19/23	—	MA	SCI/INC	—	—	Yes	—	—	—	—	—	Gray	Medium grog	2/3	Olive brown
18464	B15-12	—	Zamboanga	7	—	—	—	—	—	—	—	—	—	—	—	—	Dense gray	Medium organics and grog	—	Dark olive brown
19046	B71-9	—	Cebu	12	—	—	MA	SCI/INC	—	—	—	—	—	—	—	—	Dense gray	Medium organics	—	Dark yellow brown
19079	B73-10	—	South Cebu	10	16/21	—	MA	SCI/INC	Left	Body	—	MA	Gouges	—	Vertical	Lion	Dense gray	Medium organics	—	Olive brown

(*Continued*)

TABLE 6 (*Continued*)

UMMA CATALOG #	GUTHE #	CMS #	ISLAND	VESSEL THICKNESS (mm)	RIM DIAMETER (cm)	BASE DIAMETER (cm)	PRIMARY MOTIF (DRAGON) DECORATION TECHNIQUE	PRIMARY MOTIF (DRAGON) EMBELLISHMENT	PRIMARY MOTIF (DRAGON) ORIENTATION	PRIMARY MOTIF (DRAGON) LOCATION	INCISED FLORAL DECORATION ON VESSEL	HANDLE DECORATION TECHNIQUE	HANDLE EMBELLISHMENT	VERTICAL CHANNELS ON HANDLE	HANDLE ORIENTATION	HANDLE MOTIF	PASTE COLOR AND DENSITY	PASTE INCLUSIONS	GLAZE GROUP	GLAZE COLOR
19080	B73-11	28	South Cebu	7	15/18	—	MA	SCI/INC	—	—	Yes	Hand	—	1	Vertical	None	Dense gray	Medium organics	2/3	Olive brown
19924	C7-44	42	Oacan	10	20/25	—	MA	SCI. INC	—	Body	—	MA	—	2	Vertical	Dog	Gray	Medium organics, grog, and sand	—	Dark olive brown
34189	C16-56	45	Samar	6	—	—	MA	SCI/INC	—	Shoulder	—	MA	SCI/IMC	—	Vertical	Dragon	Gray	Medium organics, grog, and sand	—	Dark olive brown
34191	C16-38	9	Samar	8.5	—	—	MA	SCI/INC	—	Body	—	MA	—	1	Vertical	Dog	Gray	Large grog	2/3	Dark yellow brown
34191	C16-41	9	Samar	9	15/18	—	MA	SCI/INC	Left	—	Yes	MA	Gouges	—	Vertical	Lion	Gray	Small grog and sand	—	Dark brown

(*Continued*)

TABLE 6 (*Continued*)

UMMA CATALOG #	GUTHE #	CMS #	ISLAND	VESSEL THICKNESS (mm)	RIM DIAMETER (cm)	BASE DIAMETER (cm)	PRIMARY MOTIF (DRAGON) DECORATION TECHNIQUE	PRIMARY MOTIF (DRAGON) EMBELLISHMENT	PRIMARY MOTIF (DRAGON) ORIENTATION	PRIMARY MOTIF (DRAGON) LOCATION	INCISED FLORAL DECORATION ON VESSEL	HANDLE DECORATION TECHNIQUE	HANDLE EMBELLISHMENT	VERTICAL CHANNELS ON HANDLE	HANDLE ORIENTATION	HANDLE MOTIF	PASTE COLOR AND DENSITY	PASTE INCLUSIONS	GLAZE GROUP	GLAZE COLOR
34192	C16-39	—	Samar	11	—	—	MA	SCI/INC	Left	Shoulder/Body	—	MA	Gouges	—	Vertical	Lion	Dense gray	Medium organics	—	Dark gray brown
34194	C16-41	41	Samar	7	13.5/16.5	—	MA	—	—	Shoulder	Yes	MA	Gouges	—	Vertical	Lion	Dense gray	Medium organics and grog	—	Olive brown
17955	C16-45	—	Samar	7	—	—	MA	SCI/INC	—	Body	Yes	—	—	—	—	—	Dense gray	Medium organics	—	Olive
34341	C19-36	5	Samar	10	18/22.5	—	MA	SCI/INC	Left	Shoulder	—	—	—	—	—	—	Dense gray	Medium organics	2/3	Dark gray brown
34342	C19-37	—	Samar	9	—	—	MA	SCI/INC	—	Body	—	—	—	—	—	—	Gray	Small organics	—	Olive brown
34473	C23-62	35	Suluan	—	13/16	16	MA	SCI/INC	Left	Shoulder	—	MA	SCI/IMC	—	Vertical	Dragon	Dense gray	Small organics	—	Dark olive brown

(*Continued*)

TABLE 6 (*Continued*)

UMMA CATALOG #	GUTHE #	CMS #	ISLAND	VESSEL THICKNESS (mm)	RIM DIAMETER (cm)	BASE DIAMETER (cm)	PRIMARY MOTIF (DRAGON) DECORATION TECHNIQUE	PRIMARY MOTIF (DRAGON) EMBELLISHMENT	PRIMARY MOTIF (DRAGON) ORIENTATION	PRIMARY MOTIF (DRAGON) LOCATION	INCISED FLORAL DECORATION ON VESSEL	HANDLE DECORATION TECHNIQUE	HANDLE EMBELLISHMENT	VERTICAL CHANNELS ON HANDLE	HANDLE ORIENTATION	HANDLE MOTIF	PASTE COLOR AND DENSITY	PASTE INCLUSIONS	GLAZE GROUP	GLAZE COLOR
34495	C16-42	37	Samar	7	—	—	MA	SCI/INC	—	Body	—	—	—	—	—	—	Dense gray	Small organics	2/3	Olive brown
34627	C42-9	44	South Cebu	9	16/19.5	—	MA	SCI/INC	Left	Shoulder	—	MA	SCI/IMC	—	Vertical	Dragon	Dense gray	Small organics	2/3	Olive brown
34644	C46-5	—	North Masbate	9	—	—	MA	SCI/INC	—	—	—	—	—	—	—	—	Dense gray	Small organics	—	Dark olive brown
34850	C64-40	1	Calamianes	7	11/12.5	—	MA	SCI/INC	Left	—	Yes	Hand	—	1	Vertical	None	Dense gray	Small organics	2/3	Olive brown
35677	G-120-1	—	Siquijor	8	—	18–19	MA	SCI/INC	—	—	—	—	—	—	—	—	Dense gray	Small organics	—	Olive brown
35996	M2-21	3	Masbate	9	—	—	MA	SCI/INC	Left	Body	Yes	MA	—	2	Vertical	Dog	Gray	Medium organics	—	Olive brown
36097	M6-47	—	South Cebu	6	17/21.5	—	MA	SCI/INC	Left	—	—	—	—	—	—	—	Gray	Large grog	—	Olive brown

(*Continued*)

TABLE 6 (*Continued*)

UMMA CATALOG #	GUTHE #	CMS #	ISLAND	VESSEL THICKNESS (mm)	RIM DIAMETER (cm)	BASE DIAMETER (cm)	PRIMARY MOTIF (DRAGON) DECORATION TECHNIQUE	PRIMARY MOTIF (DRAGON) EMBELLISHMENT	PRIMARY MOTIF (DRAGON) ORIENTATION	PRIMARY MOTIF (DRAGON) LOCATION	INCISED FLORAL DECORATION ON VESSEL	HANDLE DECORATION TECHNIQUE	HANDLE EMBELLISHMENT	VERTICAL CHANNELS ON HANDLE	HANDLE ORIENTATION	HANDLE MOTIF	PASTE COLOR AND DENSITY	PASTE INCLUSIONS	GLAZE GROUP	GLAZE COLOR
36098	M6-48	—	South Cebu	9	—	—	MA	SCI/INC	Left	—	—	—	—	—	—	—	Dense gray	Medium organics	—	Olive brown
36003	M2-28	NA	North Masbate	6	—	—	MA	SCI/INC	—	Shoulder/Body	—	Hand	—	1	Vertical	None	Gray	Large organics and grog	—	Dark olive brown
—	M-1	NA	South Cebu	9	—	—	MA	SCI/INC	—	Body	—	MA	—	—	Vertical	Dog	Gray	Small organics	—	Olive brown

MA = mold attached; SCI = semicircular impressions; INC = incisions; Hand = plain strap applied by hand.

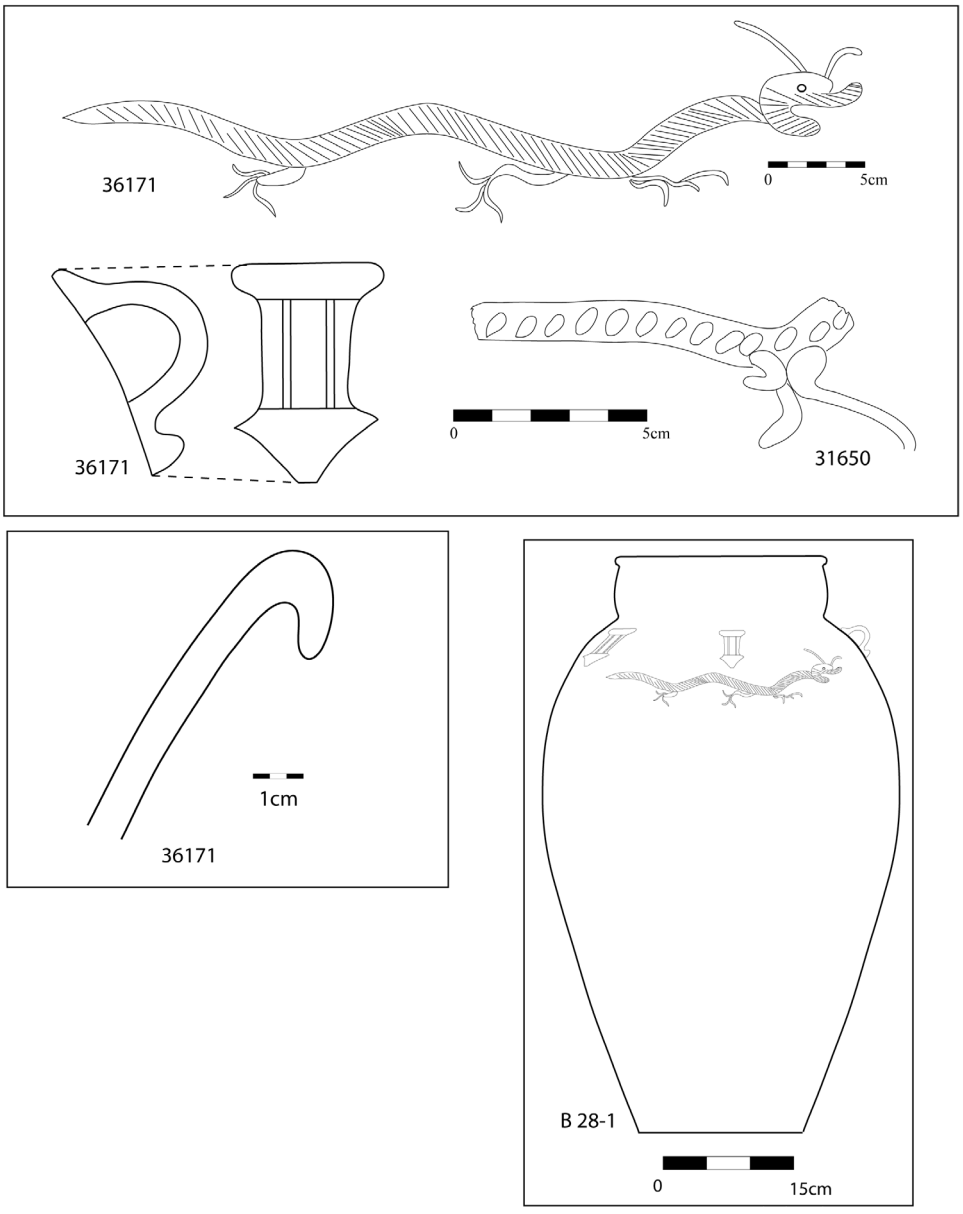

Fig. 3. Tradition 3 montage (primary motifs, handle motif, and vessel form).

time, it is necessary to explore variability of material procurement, paste preparation, and vessel formation. The four traditions are discussed in relation to evidence for different production locales in this section.

As Sinopoli and colleagues (2006) have discussed, INAA analyses conducted at the University of Missouri Research Reactor (MURR) laboratory on 29 dragon jars (and 21 undecorated stoneware jars) identified four distinct compositional signatures for

TABLE 7. PRODUCTION TRADITION 3 DRAGON JARS

UMMA CATALOG #	GUTHE #	CMS #	ISLAND	VESSEL THICKNESS (mm)	VESSEL HEIGHT (cm)	RIM DIAMETER (cm)	MAXIMUM VESSEL DIAMETER (cm)	BASE DIAMETER (cm)	PRIMARY MOTIF (DRAGON) DECORATION TECHNIQUE	PRIMARY MOTIF (DRAGON) EMBELLISHMENT	PRIMARY MOTIF (DRAGON) ORIENTATION	PRIMARY MOTIF (DRAGON) LOCATION	INCISED DECORATION ON VESSEL	HANDLE DECORATION TECHNIQUE	VERTICAL CHANNELS ON HANDLE	HANDLE ORIENTATION	HANDLE MOTIF	NUMBER OF HANDLES/VESSEL	PASTE COLOR AND DENSITY	PASTE INCLUSIONS	GLAZE GROUP	GLAZE COLOR
17995	B1-107	11	Negros	6.2	—	—	—	—	Attached coil	—	—	Shoulder	—	Hand	—	Vertical	None	—	Gray	Medium grog and sand	2/3	Dark gray brown
—	B28-1	—	North Masbate	6	63	23.5/20.5	39	18.5	Attached coil	RI	Right	Shoulder	Yes	Hand	2	Vertical	None	6	Gray/Pink	Medium sand	—	Olive brown
18859 (1)	B49-26	—	Cebu	5	—	—	—	—	Attached coil	—	Right	Shoulder	—	—	—	—	None	—	Gray	Large organics, sand, and grog	—	Olive
34650	C47-5	8	Masbate	6	—	—	—	—	Attached coil	RI	Right	—	—	—	—	Vertical	None	—	Gray	Medium sand	2/3	Olive
—	G22-41		West Cebu	5.5	63	23.5/20.5	40	19.5	Attached coil	RI	Right	Shoulder	Yes	Hand	2	Vertical	None	6	Gray/Pink	Medium sand and grog	—	Olive brown
36171	M28-30	—	Jolo	7	64.5	17/29	44	19.5–20	Attached coil	RI	Right	Shoulder	Yes	Hand	2	Vertical	None	6	Gray/Pink	Medium sand	—	Olive

RI = rough incisions; Hand = plain strap applied by hand.

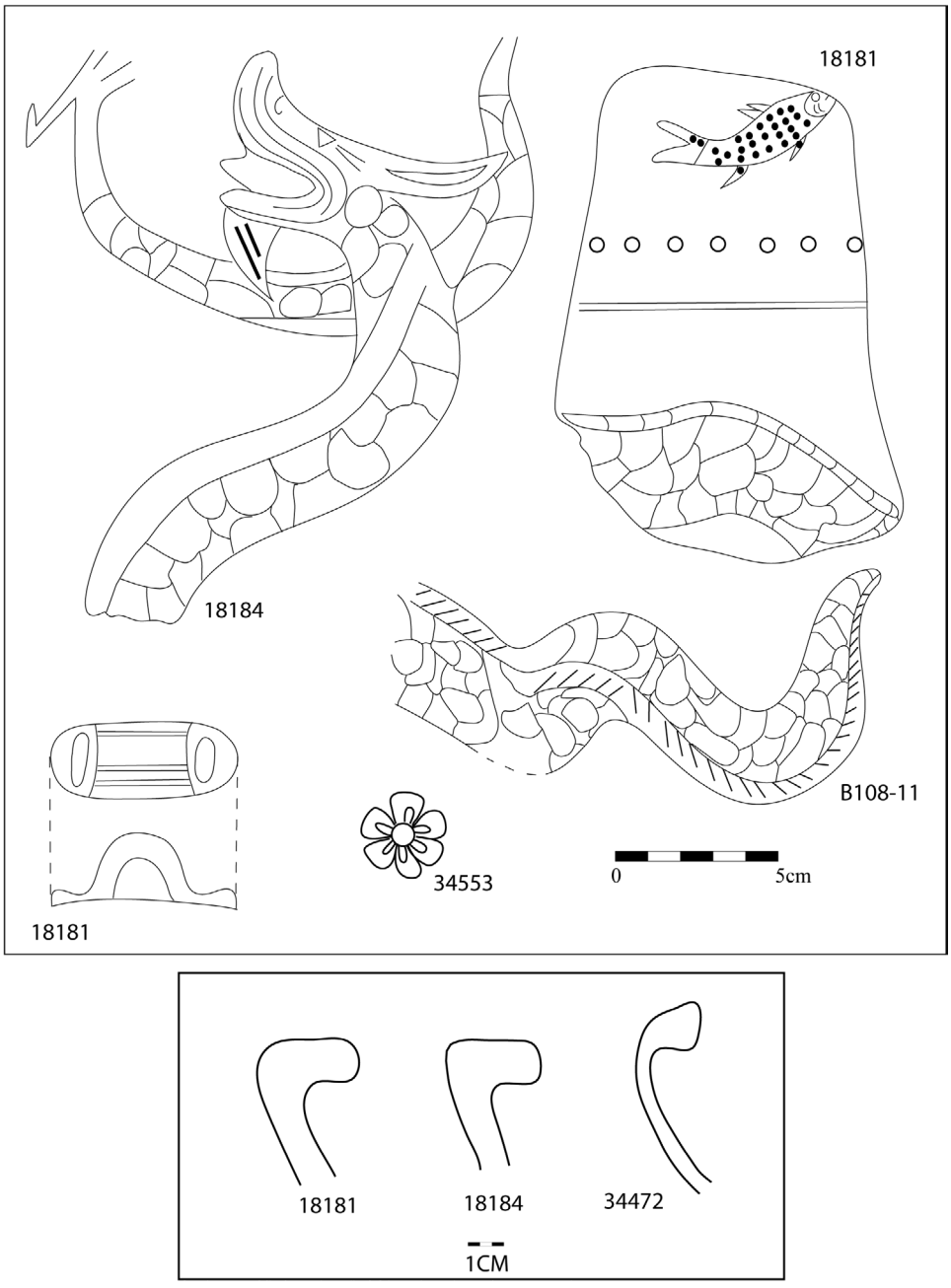

Fig. 4. Tradition 4 montage (primary motifs, handle motif, and rim form).

the traditions describe above. The results of principal component analyses suggest that vessels from Tradition 1 are the most distantly related to the other three groups, Tradition 2 and Tradition 3 are compositionally very similar, and Tradition 4 is distinct, but more similar to 2 and 3 than to 1.

Glaze analyses were performed both visually on 63 vessels and by compositional methods (LA-ICP-MS) on 20 vessels (Sinopoli et al. 2006). Compositional analyses reveal three groups, Tradition 1 and Tradition 4 are discrete, while Traditions 2 and 3 share a single glaze recipe. In principal component analyses, the composition of the glaze in Tradition 1 showed similarities to some elements of 2 and 3, as did other elements of the Tradition 4 glaze. Vessels from Traditions 1, 2, and 3 have glazes that are olive-brown, whereas Tradition 4 produced vessels that are dark yellow brown. This variation is to be expected, since Tradition 4 vessels have a red paste, while all the others use a gray paste (the glazes are semitranslucent). Since glaze recipes can be traded widely, the degree of variation between the traditions is difficult to discern. However, the differences between Tradition 1 and Traditions 2 and 3, despite their similar colors, suggest that these vessels were part of different production regimes.

Two general groupings can be made based on paste density and inclusions. Vessels from Tradition 1 have a homogeneous, dense, gray paste with few and small inclusions and vacua. Products of Traditions 2, 3, and 4 exhibit more heterogeneity within each group, ranging from dense to coarse pastes with many diverse large inclusions (i.e., sand, grog, organics).

Each vessel tradition has unique rim shapes. Rim diameter is fairly consistent across and between groups, despite the two size classes found in Tradition 1. Two groups in vessel thickness can be discerned, and cluster by decoration method. Vessels with mold-impressed and applied-coil dragons are thinner, and mold-applied decorated vessels are thicker. For example, Traditions 1 and 3 produce thinner vessels averaging 5.6 mm and 6 mm. Traditions 4 and 2 are thicker vessels at 6.8 mm and 8.2 mm, respectively. However, when Tradition 4 is divided into Traditions 4A and 4B wares, a clearer pattern emerges. Tradition 4A, the red ware with mold-impressed decorations, shows an average thickness of 6.3 mm, whereas 4B, the red ware with mold-applied decorations, shows an average thickness of 8 mm.

TEMPORAL AND SPATIAL LOCALIZATION OF DRAGON JAR PRODUCTION

As reviewed above and presented in detail in Sinopoli et al. (2006), compositional and other technological evidence indicate that three production centers were responsible for the four production traditions identified in the Guthe Collection. Enough information exists to suggest that Traditions 2 and 3 were produced at the same or very closely situated production locales (B/C). Tradition 4 should be considered as a unique production locale (D), and the vessels from Tradition 1 are the product of a strikingly different production locale (A) from the others. In the remainder of this article, I seek to explore more fully the available information on the chronology and locations of these centers and associated production traditions. In the absence of extensive research on or publication of relevant kiln sites, I draw upon a broad range of archaeological and textual research.

Information on production regions, use-life and dating for each of the production traditions can be divided into several classes of data. First, there is a growing literature on stylistic traits, motif characteristics, and the form of ceramics during the second millennium A.D. trade in Southeast Asia. Second, there is an ever-increasing body of data from the archaeological excavation or salvage of shipwrecks in the region. The wreck location and contents often provide clues as to ports of origin, routes, and destination, detailed information on the general assemblage of materials that were on

TABLE 8. PRODUCTION TRADITION 4 DRAGON JARS

UMMA CATALOG #	GUTHE #	CMS #	ISLAND	VARIANT	VESSEL THICKNESS (mm)	RIM DIAMETER (cm)	BASE DIAMETER (cm)	PRIMARY MOTIF (DRAGON) DECORATION TECHNIQUE	PRIMARY MOTIF (DRAGON) EMBELLISHMENT	PRIMARY MOTIF	PRIMARY MOTIF (DRAGON) LOCATION	INCISED DECORATION ON VESSEL	HANDLE DECORATION TECHNIQUE	HORIZONTAL INCISIONS ON HANDLE	HANDLE ORIENTATION	HANDLE MOTIF	PASTE COLOR AND DENSITY	PASTE INCLUSIONS	GLAZE GROUP	GLAZE COLOR
18181	B4-164	20	Koulan	4A	7.1	18/22.5	—	MI	MI	Dragon, floral patterns, buttons	Body	No	Hand	3	Horizontal	None	Red	Large sand and grog	4	Dark yellow brown
18182	B4-165	—	Koulan	4A	6	—	—	MI	MI	Edge of flower	—	No	Hand	3	Horizontal	None	Very red	Small sand and organics	—	Dark yellow brown
18183	B4-166	—	Koulan	4A	7	—	—	MI	MI	Dragon and floral patterns	Shoulder	No	Hand	4	Horizontal	None	Very red	Few	—	Dark yellow brown
18185	B4-168	—	Koulan	4A	6	—	—	MI	MI	Floral patterns	Body	No	Hand	No	Horizontal	None	Very red	Small sand	—	Olive brown

(*Continued*)

TABLE 8 (*Continued*)

18047	B4-30	47	Koulan	4A	6	—	25	MI	MI	Dragon and floral patterns	Body	No	—	—	—	—	Dark red	Few	4	Dark yellow brown
34472	C23-61	16	Suluan	4A	6	10/14	—	MI	MI	Floral pattern (tree)	Body	No	Hand	No	Horizontal	None	Dark red	Medium grog	4	Dark yellow brown
34553	C27-3	—	Zamboanga	4A	6	—	—	MI	MI	Floral pattern	—	No	Hand	—	Horizontal	None	Very red	Few	—	Dark brown
—	B108-11	—	Bohol	4B	8	—	—	MA	MA	Big dragon	—	No	—	—	—	—	Red	Small sand	—	Dark olive brown
18184	B4-167	39	Koulan	4B	8	—	—	MA	MA	Big dragon	Body	No	Hand	3	Horizontal	None	Red	Few	4	Dark yellow brown
18053	B4-36	40	Koulan	4B	8	—	—	MA	MA	Big dragon	Body	No	—	—	—	—	Red	Few	4	Dark brown

MI = mould impressed; MA = mould attached; Hand = plain strap applied by hand.

board, and sometimes a precise date based on the records of the ship's loss. Third, there are the emerging results of archaeological investigations of kiln sites in Central Viet Nam by Vietnamese and Japanese researchers. These kilns are believed to be associated with Vijaya, one of the central states of Champa.

Production Locale A (Tradition 1)

All standard Tradition 1 jars were produced in a single production locale.

No shipwreck information is yet available for production Tradition 1. Valdes et al. (1992:114–115, plates 39–40) attribute similar vessels to southern Chinese kilns near Quanzhou port in Guangdong Province, dating to the thirteenth and fourteenth centuries. Harrisson (1986) suggests a similar provenience and date. Similar jars recovered from Malaysia are dated to the end of the thirteenth century to the fourteenth and fifteenth centuries; in addition, Tradition 1 handles have been found in a context dating to the Song/Yuan period (Lam et al. 1985:111–112, plates 230–234, 236). Since the Pandanan and *San Diego* shipwrecks did not contain any vessels with Tradition 1 primary motifs, and coupled with the above known attributions, it is possible that Tradition 1 vessels were produced before the mid-fifteenth century.

Technologically, evidence for the organization of production of this group matches well with a Chinese origin, with standardized production (exterior and interior homogeneity) similar to that described in other archaeological artifacts produced by Late Song, Yuan, and Early Ming period Chinese artisans and found in the Philippines. Temporally, this group matches well with known information on the Late Song, Yuan, and Early Ming dynasties' direct and intense trade in the Philippines between the fourteenth and fifteenth centuries, and likely was produced during this period. No similar vessels are known from Vietnamese sites.

Production Locale B/C (Traditions 2 and 3)

Jars from Tradition 2, Tradition 3, and the Kingany vessel (alternative Tradition 1) were all produced at either the same or very closely situated production locales at different times. Collectively, production at locales B/C spans the entire temporal period under discussion.

Tradition 2 vessels are known from several shipwreck sites, dating from the mid-1400s to 1600. All of the dragon jar vessels reported from the A.D. 1600 *San Diego* shipwreck (Desroches et al. 1996; Valdes and Alba 1993) belong to Tradition 2. Published jars from the *San Diego* are identical to those found in the Guthe Collection in form, decoration, handle techniques, and intra-group diversity. The broad diversity present in the *San Diego* jars suggests that the intra-tradition variability in form was synchronic.

Jars of this tradition were also recovered from a fifteenth-century shipwreck off Marinduque; they are attributed to the southeast Chinese port of Zhangzhou in Fujian Province (Quimpo 1982:33–48, plates from pages 35, 46, and 47). A mid-fifteenth-century shipwreck off Pandanan Island contains dragon jars with Tradition 2 primary motifs (Loviny 1996:39, 54). This ship is believed to have sailed from central Viet Nam (Diem 1999, 2004). In this case, the dragon looks visually similar, with impressed scale embellishments; however, this dragon jar has a Tradition 1 mold-

impressed handle. In our sample of 35 jars in Tradition 2, no vessels had a handle resembling those from Tradition 1.

Several scholars have proposed chronological and provenience attributions for Tradition 2 jars. According to Valdes et al. (1992), the jars likely derive from the Guangdong region in China and date to the sixteenth century. However, Harrisson (1986) dates them to fifteenth–sixteenth-century Viet Nam, and John Guy (1986 : 111, plate 105) attributes Tradition 2 dragon jars to the Vietnamese Go Sanh kilns of the fifteenth and sixteenth centuries. Brown (1988: plate 22) likewise suggests that Tradition 2 jars were produced at the Go Sanh kilns, although at the time all three authors were writing the central Vietnamese kilns had not yet been explored archaeologically. Several rim profiles from the kiln sites of central Viet Nam resemble Tradition 2 in rim shape and shoulder angles (Morimoto and Ohashi 2002: fig. 5, no. 16; Yamamoto et al. 1993 : 176, figs. 1, 3–4).

In contrast, Tradition 3 vessels appear to be the earliest in the Guthe assemblage. They were recovered from the twelfth-century Jepara shipwreck, off the coast of Java (Djuana and McKinnon 2005 : 137, figs. 10–11). Likewise, Valdes et al. (1992 : 102–109, plates 16–19, 26–29) attribute similar forms to the Quanzhou kiln complex in China dating to the twelfth through fourteenth centuries (Song and Yuan dynasties). Tradition 3 vessels are also attributed by Lam et al. to the twelfth–fourteenth-century Quanzhou kilns (1985 : 110, nos. 229a and b). Simple vertical handles were produced in the kilns of central Viet Nam (Koezuka et al. 1996 : 24–25, figs. 12, 14); however, similar handles are found throughout Southeast Asia.

Due to sample size and diversity, this is the weakest group identified in my research, both compositionally and technologically. Only two of three fragmented vessels with Tradition 3 dragons were compositionally analyzed, and the other three vessels are whole pots and were not included in the INAA study.

The Kingany vessel (alternative Tradition 1) clusters compositionally with Traditions 2 and 3 in the INAA and the LA-ICP-MS analyses, and was therefore produced at production locale B/C (Sinopoli et al. 2006). Originally excavated from a cavity in the washroom of a "bourgeois" house and presumably used as a receptacle for wash water by the residents, the deposition context of the jar dates to the fifteenth century (Vérin 1972 : 295–301; Wright et al. 1996). While this date generally matches the late temporal period for Tradition 1 jars presented above, the vessel has other characteristics that indicate production at locale B/C, notably a rim identical to those from Tradition 2 and large imperfections in the glaze and potentially in the paste, characteristics found in other vessels from locale B/C and not in vessels from locale A. This Kingany vessel shows that the dragon jar external "styles" may not have been uniquely produced in one place, with only subtle differences in the production process differentiating locales.

Production Locale D (Tradition 4)

Dragon jars from both Traditions 4A and 4B are sourced to the same production locale. However, shipwreck and excavation data indicate that they may be temporally distinct.

Several lines of evidence place Tradition 4A in the mid-fifteenth century with a production locus in central Viet Nam (Diem 2004 : 478, fig. 2; Loviny 1996 : 50,

100–101, figs. 7–8). The majority of dragon jars from the Pandanan Island shipwreck noted above belong to Tradition 4A and vessels resembling Tradition 4A jars with similar profiles and necks, red paste, and identical motifs have been recovered from fifteenth–sixteenth-century central Vietnamese kiln sites (Aoyagi 2002: fig. 4, no. 20; Koezuka et al. 1996:24, 27, figs. 4–5, 50; Yamamoto et al. 1993:176, figs. 6, 12, 15–16; 1995:50, 85, 100, figs. 7–8). Recent work by Diem also indicates that the mold-impressed vessels from our Tradition 4A are identical to those found at the kilns and the Pandanan shipwreck (Diem 1999, 2004).

Both Valdes et al. (1992:141) and Harrisson (1986: plates 108–112) date Tradition 4B vessels to the seventeenth to eighteenth centuries, although Valdes et al. attribute them to South China and Harrisson to Viet Nam (which is supported by the data on similarly sourced Tradition 4A). Several indirect lines of evidence also suggest that Tradition 4B vessels post-date those of Tradition 4A. First, Traditions 4A and 4B, compositionally sourced to the same place, do not co-occur in the Pandanan shipwreck, which may suggest temporal variability within the production locale. The mold-applied techniques of Tradition 4B also appear to be most similar to ones used for Tradition 2 jars found in the A.D. 1600 *San Diego* shipwreck (Desroches et al. 1996), perhaps suggesting that mold-applied techniques may post-date mold-impressed. The shift in techniques could have been a regional diachronic trend that occurred at multiple production centers, but perhaps at slightly different times.

SUMMARY

Production locale A was likely in southern China, and our jars were produced in the thirteenth to fifteenth centuries. Production locale D was situated in central Viet Nam, and our jars are products of the fifteenth to at least the seventeenth centuries. Evidence for the provenience of production locale B/C is more complicated, with its intra-center diversity and longevity of production (see Table 9). Several archaeological dates are available for the diverse traditions practiced at the locale: the twelfth-century Jepara shipwreck date (Tradition 3), the *terminus ante quem* fifteenth-century date for the deposition in Madagascar of the Kingany vessel (alternative Tradition 1), the mid-

TABLE 9. PROPOSED CHRONOLOGY OF DRAGON JAR TRADITIONS

PRODUCTION TRADITION	PRODUCTION CENTER	KILN LOCATION	DATES
1	A	China	c. A.D. 1200–before 1450
3	B/C	China	c. A.D. 1100–1400
Kingany Vessel	B/C	China	before A.D. 1450
2	B/C	China	A.D. 1450–1600
4A	D	Central Viet Nam	c. A.D. 1450 to (?)
4B	D	Central Viet Nam	c. A.D. 1600–1800 (?)

fifteenth-century date for the Pandanan vessels (early Tradition 2), and an A.D. 1600 date for the *San Diego*'s typical Tradition 2 vessels. As discussed above, the Pandanan vessel may mark the transition between techniques at the center, as it exhibits a Tradition 2 primary motif and associated Tradition 1 handle. Since no vessels that match this transitional form are found in the Guthe Collection, it can be inferred that our Tradition 2 jars post-date the mid-fifteenth century. The hand-coiled decorative techniques that characterize the Tradition 3 vessels likely pre-date both, based on the Jepara shipwreck and historical attributions, and their absence from later shipwrecks. Production locale B/C thus comprises a long temporal sequence of dragon jars, starting with Tradition 3 vessels and the Kingany vessel made between the twelfth and fifteenth centuries (none have been found in shipwrecks of the fifteenth and sixteenth centuries), and Tradition 2 vessels from the fifteenth, sixteenth, and likely into the seventeenth century.

With our expanding knowledge of the central Vietnamese kilns and their products, little evidence for primary motifs and plastic handle decoration from locale B/C has been found, despite some similar rim forms. At present, due to the longevity of this production center and similar stylistic ideals (vertical plastic handles, glaze colors), the location of the region responsible for production should be sought in China, and according to several researchers, likely in Guangdong, Southeast China (Lam et al. 1985; Valdes et al. 1992). However, despite similar stylistic variables, technological differences suggest that locales A and B/C were organized very differently and exhibit a large degree of variability in the nature of production, despite their potentially common political origin.

Based on the above information, we can identify a broad trend in dragon jar decoration techniques from coil-based, to mold-impressed, to mold-applied techniques. Early jars (Traditions 1 and 3) have dragons on the shoulder that are later expanded onto the body in Traditions 2 and 4, and vessel thickness increases with mold-applied techniques. Concurrently, the visual appearance of the dragon and other motifs also changed, with potters employing more elaborate and larger decorations over time. Evidence from the Pandanan shipwreck also suggests that mold-applied techniques in production locale B/C (Tradition 2) likely pre-date a similar technological development (4A to 4B) at production locale D. Glaze composition did not change over time within individual production locales.

The evidence from the INAA and LA-ICP-MS compositional analyses for production locales A and B/C suggests that different production centers may have occasionally or always produced visually similar, but not technologically exact, dragon and handle decoration motifs, suggesting the need to record all technological variables available on a sample. The results of this study establish that non-visual categories, such as the clay, inclusions, glaze recipe, and paste treatment, as well as technological variations in seemingly identical primary motifs and handles are useful indicators to separate production locales, due to differential organization of production.

TESTING THE PROPOSED CHRONOLOGY AGAINST THE GUTHE COLLECTION

The sequence presented above was tested against the Guthe Collection both spatially and by site type (see Table 10):

TABLE 10. DISTRIBUTION OF DRAGON JARS FROM THE GUTHE COLLECTION

PRODUCTION TRADITION	CAVE SITES		BURIAL GROUNDS		MISCELLANEOUS	
	N	ISLANDS	N	ISLANDS	N	ISLANDS
1	4	North Mindanao, West Cebu, South Bohol	3	Bohol, Cebu	4	Camaguin, Siquijor, Jolo
2	14	Oacan, Samar, South Cebu, North Masbate, Calamianes	15	Koulan, Zamboanga, Cebu, South Cebu	6	Siquijor, Masbate, South Cebu, North Masbate
3	1	Masbate	3	North Masbate, Cebu, Negros	2	West Cebu, Jolo
4A	2	Suluan, Zamboanga	5	Koulan	None	None
4B	None	None	3	Bohol, Koulan	None	None

Tradition 1 vessels are found in cave sites, isolated graves, open-air burial grounds, and miscellaneous sites in the Philippines. All jars except for that from Jolo are located around the southern interior seas of Visayan, Camotes, and Mindanao (see Figure 5).

Tradition 3 jars were recovered from a cave, open-air burial grounds, an isolated grave, and a miscellaneous context. All except for the vessel from Jolo are located around the southern interior seas of Visayan, Camotes, and Mindanao (see Figure 6).

Tradition 2 dragon jars are found in a larger diversity of locations throughout the central and southern islands, including caves, open-air burial sites, a single grave site, and some in miscellaneous contexts. Jars were recovered from sites located throughout the southern archipelago, with most (74%) deposited away from the central interior seas of Visayan, Camotes, and Mindanao (see Figure 7).

Tradition 4 vessels can be divided between 4A and 4B jars, with the 4A vessels deposited in both cave and open-air burial sites, and 4B jars in only open-air burial sites. Tradition 4 vessels in general seem to mirror the spatial pattern found for Tradition 2, with only one out of ten found on islands around the central interior seas of Visayan, Camotes, and Mindanao (see Figure 8).

The co-occurrence of various dragon jar production traditions confirms the temporal patterns suggested above. Traditions 1 and 3 co-occur on Jolo (M28) as well as at the one burial site that they have been attributed to on Cebu (B49). Vessels from these groups were not found in sites that yielded Tradition 2 and 4 jars. The spatial extent of their collective distribution is around the central interior seas of the southern archipelago.

Tradition 2 and 4 vessels co-occur at a cave site (C23 on Suluan) and one burial site on Koulan (B4). A Tradition 2 vessel and two Tradition 4A vessels were found in the cave, mirroring the co-occurrence of similar vessels on the Pandanan shipwreck.

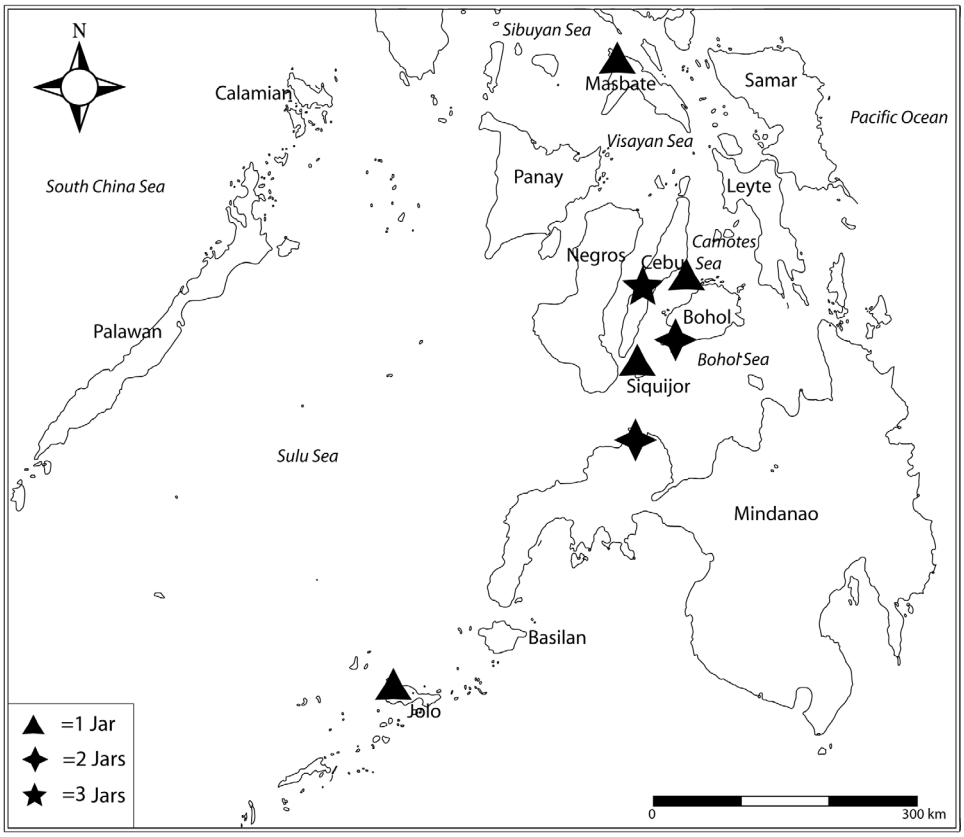

Fig. 5. The distribution of Tradition 1 dragon jars.

The large burial site of B4 contains ten vessels from Tradition 2, five vessels from Tradition 4A, and two vessels from Tradition 4B. It would seem from this additional co-occurrence that Tradition 2 and 4A vessels were likely produced at least starting in the mid-fifteenth century with Tradition 2 vessels in production until at least 1600 as exhibited on the *San Diego*. It is likely that Tradition 4B, which does not occur solely with Tradition 2 without Tradition 4A also present, does post-date Tradition 4A, with the production center starting to use mold-applied techniques at the earliest following the mid-fifteenth century.

Jars from Traditions 2 and 4 were found in a wider variety/different places in the southern Philippine archipelago than Traditions 1 and 3, with two open-air cemeteries with many dragon jars appearing on Koulan and Samar, away from the central interior sea area where Tradition 1 and 3 vessels were almost exclusively found. If the temporal sequence of jar types is valid, the patterns suggest a spatial expansion in jar distribution and, perhaps, large burial sites. In short, an expansion in the trade is seen in the wider diversity of islands with access to dragon jars over time, including those away from the central seas (see Figures 9 and 10). This pattern is further enforced by evidence of porcelain distribution described by Li in this volume.

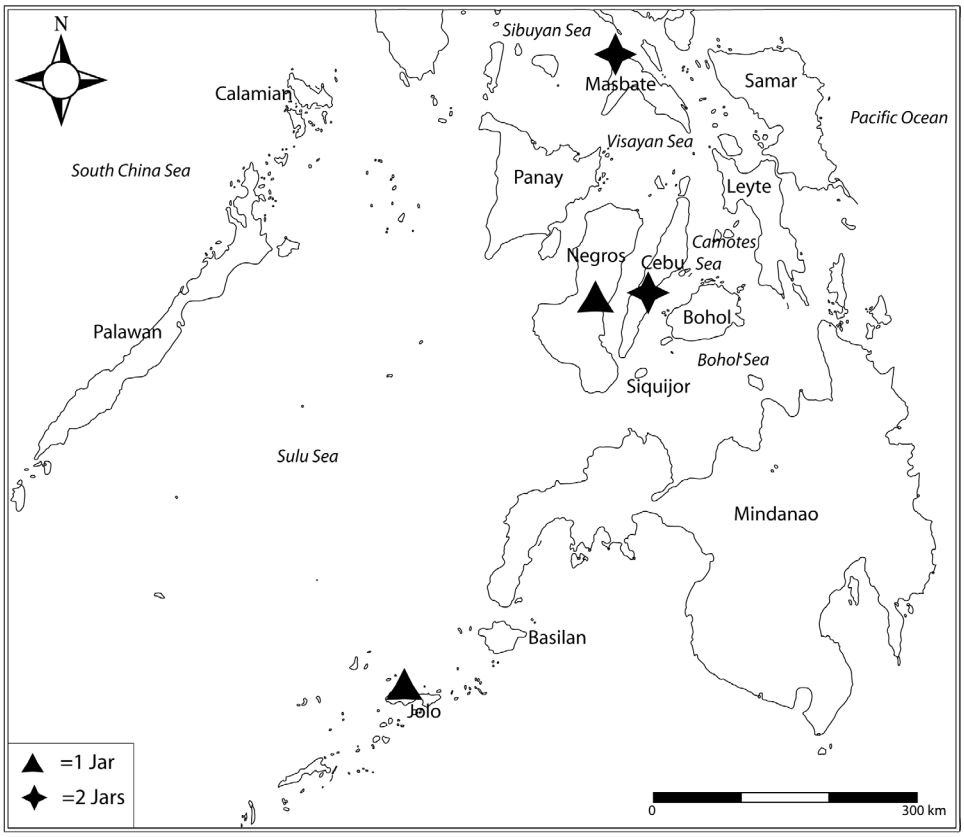

Fig. 6. The distribution of Tradition 3 dragon jars.

DISCUSSION

If the postulated Chinese origin of Tradition 1 is considered, then these jars may be indicative of Late Song, Yuan, and Early Ming involvement in the Philippines. Tradition 4 jars, with a well-substantiated provenience to Champa territories of Central Viet Nam may represent the general diversification of the interregional trade during the mid- to late fifteenth century, as well as evidence of the "Ming Gap" postulated by Roxanna Brown (2004). The situation is more complicated for products of production locale B/C, as vessels seem to span the entire temporal sequence from Song and Yuan, to Ming commerce, and likewise the entire technological span from the hand-coiled decorations of Tradition 3 to mold-impressed in the style of Tradition 1 (the Kingany vessel), and lastly mold-applied Tradition 2 vessels. The longevity of production suggests a Chinese origin for this group, as some vessels were clearly produced during the Song and Yuan periods, and the relatively large number of Tradition 2 vessels may mark the re-emergence of foreign trade during the Late Ming dynasty (see Brown 2004). Interestingly, the absence in our collection of the transitional Tradition 2 vessels that were found in the Pandanan wreck may provide additional evidence for the Ming Gap of Chinese-produced jars in the Philippines, as

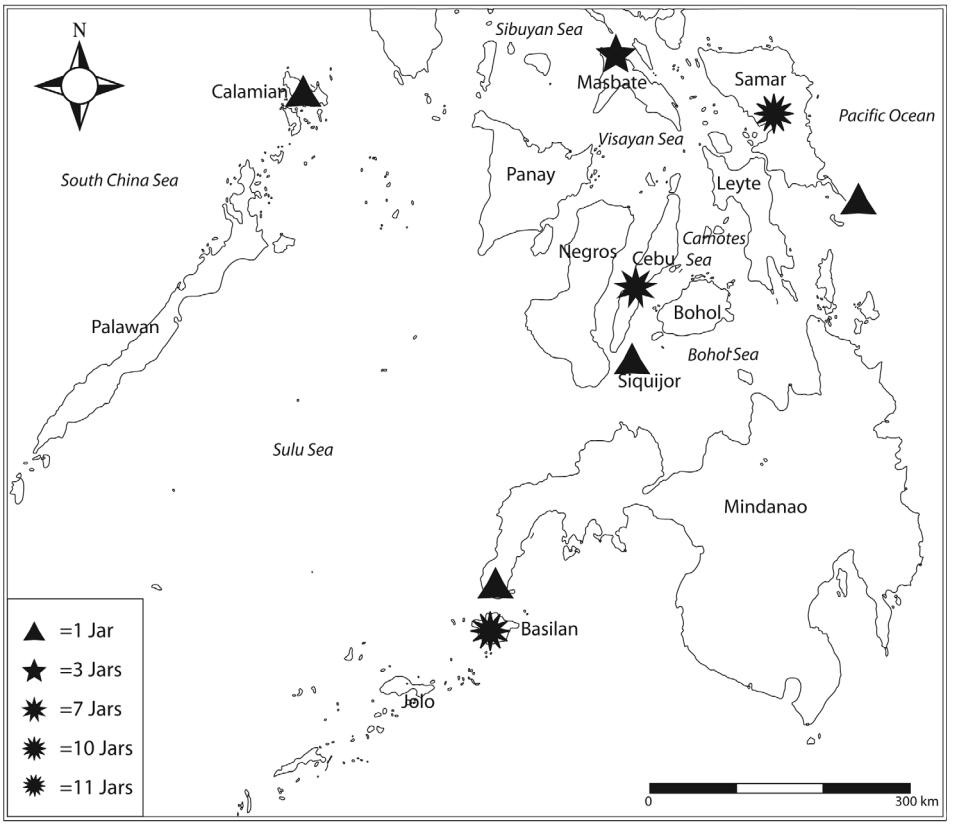

Fig. 7. The distribution of Tradition 2 dragon jars.

Guthe recovered Vietnamese Tradition 4A, but not the contemporaneous Chinese jar. Understanding the exact provenience of locales A and B/C will reveal a great deal about the organization of trade during this period. For example, perhaps two production centers in southern China were responsible for Tradition 1 vessels, with only one developing (or continuing) Tradition 2 techniques.

Co-occurrence of only contemporary jar production traditions within the two-part temporal sequence at sites around the Philippines suggests that the curation of jars as heirlooms may not have been significant historically, with individuals aiming to obtain their own jars and be buried with them. However, without a detailed understanding of the regional distribution and nature of the various societies in the Philippines during this period, it is possible that there were diverse practices with some groups or individuals gaining prestige through the inclusion of jars in burials and other societies for whom transmission of jars as heirlooms was of social significance.

Several trends in jar technology and decoration may suggest that the secondary life of jars in local sociocultural settings after their use in trade may have influenced their formal and decorative characteristics. For example, jars became thicker over time, and it is possible that these jars were sturdier, and consequently had longer use-lives.

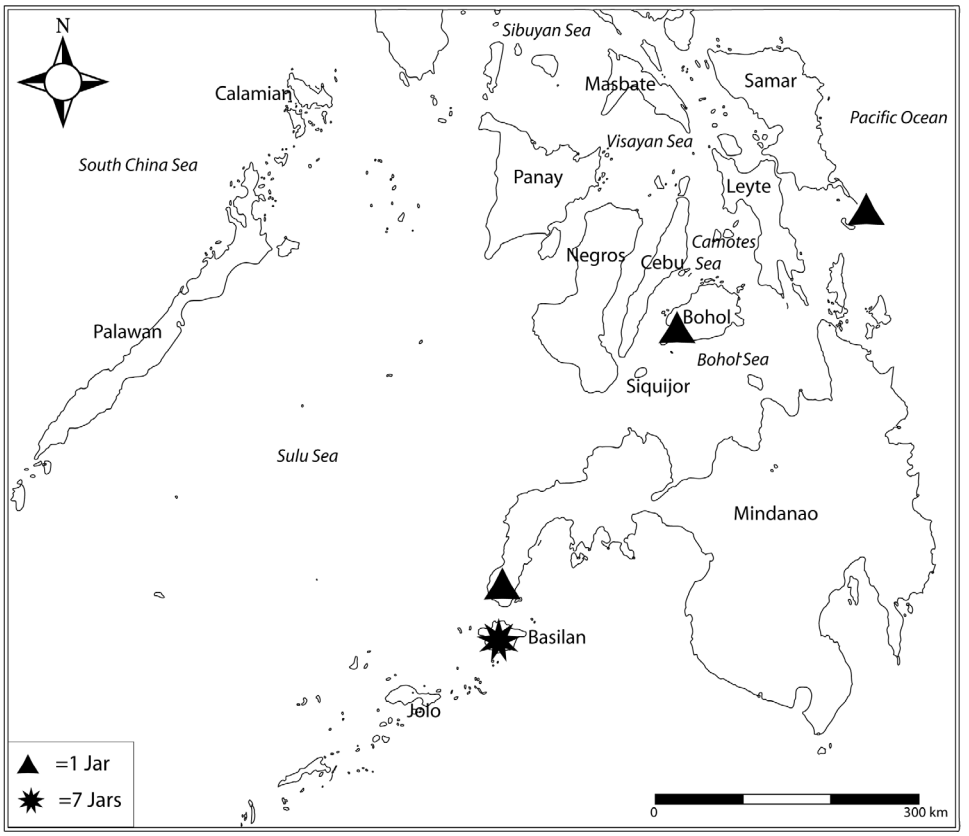

Fig. 8. The distribution of Tradition 4 dragon jars.

Secondly, jars became more elaborately decorated over time, with Tradition 1 and 3 vessels decorated (dragon and occasional incision) on the vessel shoulder, whereas in Traditions 2 and 4 dragons and floral motifs are found from the shoulder all the way to near the vessel base. It is possible that the increase in decoration of storage vessels was influenced by their use as a trade item with added value. In social settings where jars symbolized status, and were themselves ranked historically in some parts of Southeast Asia, it would be unsurprising if producers responded to the desires of locals for more elaborate vessels.

CONCLUSION

In this article, I have examined a small subset of jars from the Guthe Collection. Nonetheless, its implications are many both for this collection and for larger understandings of second millennium Asian trade and political economies, and the scholarly potential of this little studied vessel category. Through an examination of the techniques responsible for jar production, particularly of decorative elements, multiple production locales have been discerned. Chronologically, the four traditions identified bridge the period from initial indirect Chinese trade in the Philippines during

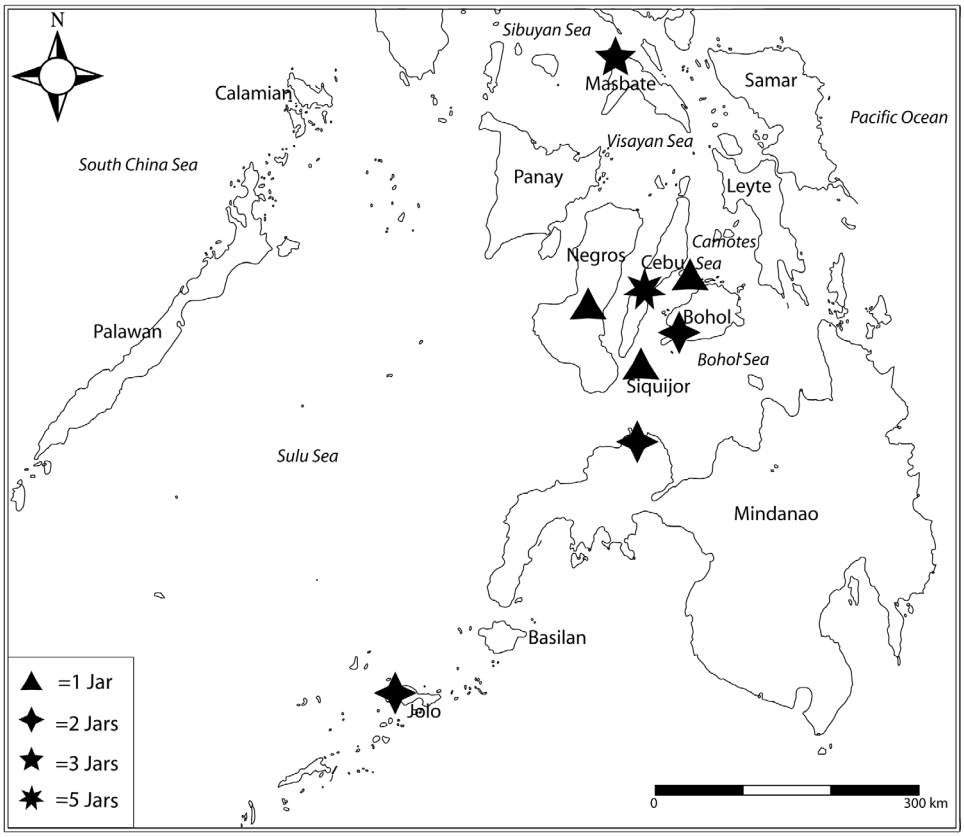

Fig. 9. The distribution of Late Song, Yuan, and Early Ming dragon jars.

the twelfth and thirteenth centuries (Traditions 1 and 3), and the direct and more intense participation (Traditions 1 and 3) of the fourteenth century, to the growing diversification of trading and producing partners beginning after A.D. 1426 (Tradition 4A), and the Spanish conquest of the late sixteenth and early seventeenth centuries (Tradition 2 and likely 4B). These international shifts can be linked to correlated shifts in mortuary programs within the Philippines.

Evidence for differences between production regions may itself be significant, as the organization of production of a single class of vessels may have been different due to the particular political or economic contexts and traditions within which ceramic production was embedded. For example, the intra-group diversity of locales B/C and D wares suggests that either multiple production groups were in operation simultaneously, or choices changed frequently in various techniques. I would argue that given the wide diversity found even within the dragon motifs themselves, that many different potters were regionally involved in production. As has been discussed throughout the article, the wares from locale D were likely produced in the Champa setting, politically a loose confederation of states, such that jar production may have been noncentralized, or dispersed like the organization of the polity. Consequently, it is possible that a similar organization characterized the area of locale B/C, and that the

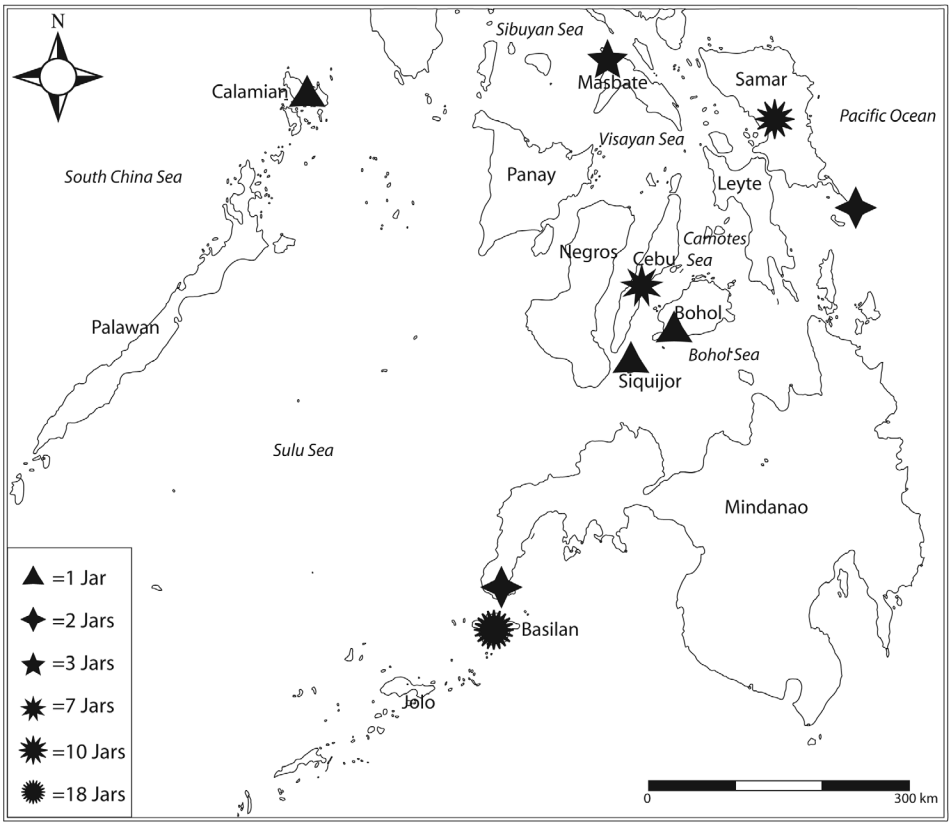

Fig. 10. The distribution of Mid / Late Ming dragon jars.

noncentralized local organization was unmodified by the Chinese state over time. The local political setting at locale A may have been more sociopolitically centralized, as its products were much more homogenous and standardized in paste and decoration. The difference in production between these two proposed areas of China may indicate that the Chinese state practiced some degree of indirect rule within certain economic spheres, with local organizational forms left in place.

While the organization of production may have been left to local decisions, data from the Guthe Collection may support the historically known reorganization of commerce by licensed Chinese merchants with the installation of the Ming Dynasty in A.D. 1368. For example, prior to the Ming Gap there are two production locales active in China, locales A and B/C. However, only locale B/C carries through to the Middle and Late Ming periods. This may indicate a shift in (and/or reduction in the number of) ports utilized as the state centralized control over trade, and possibly over these cities. However, the consistency in jar manufacture spanning this shift suggests little interest in altering the mode of dragon jar production.

My goal in undertaking the study presented here was to describe the patterns in a small assemblage of dragon jars in hopes of building a chronology of general use.

Several specific trends in jar production have been identified. These include a general technological development from mold-impressed and hand-coil decorated motifs to mold-applied techniques starting in the mid-fifteenth century. This chronology provides a preliminary point from which diachronic trends in the region can be ascertained. Jars are particularly important to sequence, as storage containers are necessarily associated with all trade events, whereas the products that they carried may have changed frequently. The test described on patterning of dragon jars across time and space and burial type in the Guthe Collection is only a first example of the potential for similar kinds of studies to address research questions in the region.

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NOTES

1. Preliminary patterns of this study and a detailed description of the chemical analyses were presented in Sinopoli et al. 2006.
2. Essential information on dragon jar production comes from interviews conducted by Barbara Harrisson with Lau Hua Kee, a potter who produced stoneware jars in Sarawak, Borneo, in the mid 1980's (Harrisson 1986).

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ABSTRACT

This article presents the results of a detailed analysis of four dragon jar groups found in the Guthe Collection at the University of Michigan Museum of Anthropology. Dragon jars are a class of decorated stoneware storage vessels that were employed in trade throughout Southeast Asia during the second millennium A.D. The jars in this study, recovered from mortuary contexts, are a unique data set due to their wide deposition throughout the southern Philippines. An exploration of intra-group and inter-group patterning has revealed temporal patterns and likely production locales for dragon jar manufacture over the course of the twelfth to seventeenth centuries. These temporal and spatial trends are then applied to the Guthe Collection to examine jar distribution throughout the Philippines over the critical period spanning the emergence of large-scale international commerce in the region. This study contributes a well-defined chronology for a commonly found material class, as well as knowledge of regional trading patterns. KEYWORDS: Southeast Asia, ceramic classification, dragon jars, trade.